The Dental Digest.

Vol. V. CHICAGO, MARCH, 1899. No. 3.

Original Contributions.

OPENING LECTURE.

DELIVERED BY B. HOLLY SMITH, D.D.S., BEFORE THE STUDENTS OF THE BALTIMORE COLLEGE OF DENTAL SURGERY, OCTOBER, 1898.

Gentlemen:—Upon me has devolved the pleasant duty of speaking to you in behalf of the faculty the words of cordial greeting and welcome. Incidentally, since for some time to come this faculty will occupy towards you a monitorial or advisory capacity, it will not be inappropriate to outline our reciprocal and related duties, or to so far anticipate actual conditions as to assume the magisterial function and offer such suggestions and advice as may befit the occasion.

I understand perfectly that a great many bright and witty things have been uttered regarding the cheapness of advice and the facility with which it may be obtained, and I am aware of the very human tendency on the part of us all to resent that assumption of superiority which the offer of advice implies; but I feel sure you will indulge me at this time, partly because of my representative capacity, but chiefly because of my deep and abiding interest in the profession you have chosen for your life-work, the college at which you are now become students, and in the student-life of the young man who here begins to equip himself for the more earnest and enduring struggle.

There is in addition a concession to be made to experience, whoever may possess it, an indulgence to be granted to the veteran, and a general disposition to trust the directions and instructions of those who have "been through the mill." The old maxim that experience is the best teacher might, it appears to me, be construed to mean that it is at least possible to learn by the experience of others, and not have to rely always upon our own sufferings in order to avoid future pitfalls and misfortunes. Such is in part my apology for all I shall utter in a fatherly rather than in a brotherly fashion.

But first, I think you are the subjects of most hearty congratula-

tion at this time and that in many respects your position is a most enviable one. I know, because I have felt it, the impatience which many of you may now or will hereafter experience—the ardent desire to leave what seems to you the mimic strife of preparation and to enter the arena of actual life struggle; but frankly, while this chafing under delay and restraint is in many respects a favorable indication, implying energy and vigor, it often seems to me now a great mistake. I admit it is not an error which you or I will soon correct, but the student's life would be made so much more enjoyable and profitable if this mistake could be corrected. For if there is a time of life in which the vexations and sorrows are at their lowest and the delights and joys are at their highest point, it is the student period. All the elements of a consoling and rational joyousness are there; youth with its elasticity and upward, buoyant trend. Congenial employment, adapted to one's ability, and not the drudgery and over-work of necessity's work-shop. Friendly and delightful intercourse with congenial spirits—the mutual flowering of those nobler attributes of friendship, courtesy and love, as they are developed and exhibited alone among students—enduring in many instances to be the comfort and consolation of riper manhood and mellow age: for what sage or hero of our acquaintance but has published his glad testimony to the firmness and constancy of his college friend, and we can never hope to know the innumerable instances undeclared and mute which have comforted and blessed the lives of college students in all ages.

Again, you have the delights of the only acquisition, it seems to me, that can come to us without smirch or taint, without the sense of humiliation or the display of greed or selfishness—the acquisition of knowledge. It is yours to revel in the glory of a conscious and continuous development, and to feel that your wealth has not intensified the bitterness of any one's poverty.

Upon you is dawning, as upon one who is just scaling the view-commanding summit, an inspiring and stimulating sense of the vastness and richness of material creation and intellectual empire. In you is awakening the noble consciousness of strength and hope which accompany growth and development. You have been spared the disgust of satiety and the despair of decay. You are as yet spared the pangs of a bitter and purposeless regret for wasted opportunities and neglected advantages. The catalogue of your sins of

omission and commission cannot yet be very extensive, and you are naturally inspired with the nobler desires and emulations of youth. Are not these the elements and the attributes of a happy period of life, and does not this seem a joyous time arising from facts and conditions peculiar to your occupation, and not altogether from the perfect heart action, the unimpaired digestion and the normal liver incident to youth and health? I feel sure that your more thoughtful judgment will concede the correctness of my conclusions, and that you will agree with me that there is ample ground for congratulating you because you are participants in the freshness and brightness of a student's life.

But if you are to be congratulated because of your occupying the vantage ground of hope and buoyancy, there also appears to me much reason for felicitating you upon your choice of life-work. We have all heard and are all convinced of the nobility of all labor, and there are among us doubtless no heretics who will gainsay the truth of the doctrine that all labor is honorable, but we must agree that there is at least a great difference in the kinds of labor, and a variety in the abilities and talents required for the different kinds.

We have also to consider the end and aim of any particular occupation before we may assign to it its proper rank in the list of honorable vocations. It may seem an entirely superfluous utterance to remind you that you have selected for your life-work an occupation in which success requires a high grade of ability, a patient and even toilsome labor of preparation, and a preeminent degree of self-sacrifice.

Dentistry has already had its honorable and distinguished place assigned among those callings that are distinctly and specifically classed as professions. That it may the more worthily deserve the title, as the years go by, must be our united and earnest care. For I hold that we must value the success and dignity of this profession above personal considerations and beyond individual success.

It is not enough that you are convinced that broad culture and severe scientific training are essential to entry into this profession, though of these facts we hope to furnish sufficient subsequent proof. What we desire to stimulate among you as conserving and elevating to our common calling is a strong and healthy growth of what we may call the professional spirit. Consider, if you please, then the high character and functions of this profession, whose portals you

are striving to enter, and you must agree with me that you are fortunate in the choice of your vocation.

The third reason I have for congratulating you is that you have entered the B. C. D. S.; that your training is to be conducted in an American institution; that your future is to be associated with the history of the college which gave birth to dentistry as a profession, and in a country where the practical methods advocated and adopted by the pioneers in this calling have yielded such rich and abundant fruit. It is interesting to note that the educational sensation of last year in France was the book of a Paris editor, entitled "The Secret of the Superiority of the Anglo-Saxons." The comparison was between the Anglo-Saxons on the one hand and the French and Germans on the other. The "secret" alleged was the superior adaptation of English and American educational methods to form efficient and practical individuals. This feature of American instruction which attracted the attention of the Parisian author has for all time been the policy and practice, not only of those whose heroic struggle has long since received its reward, but also of those whose zealous care has guided the later years of this school's honorable life; and now you may share with me the pardonable pride I feel in being connected with an institution whose influence and impetus was in the beginning paramount in the dental profession, and which has renewed its strength as the years have passed. It has always kept abreast of progress and in touch with professional spirit and practical advancement. Her earlier graduates have molded professional thought, stimulated professional pride, and made it possible for their associates and successors to receive a measure of respect and esteem, which though no more than their due, was nevertheless, to those familiar with the early history of dentistry, truly remarkable. To-day we gladly see her sons the leaders in scientific research and investigation, the champions of professional advancement and the heralds of a stronger and a more useful position among the liberal callings. In every country, in every clime, her children have reached positions of distinction and stamped the impress of superiority for American dentistry.

In this remarkable advance made by the dental profession we see further and more than our foreign friend; while granting and glorying in all that is said about the superior practicality of our educational methods, we claim a more enduring effect from the tonic

quality of the atmosphere of our educational institutions and the moral fibre of our race. England so well recognizes the necessity of perpetuating the Anglo-Saxon spirit through all her public service, that in India a candidate for admission to the civil service is not only required to possess sufficient information to pass the examination, but as a prerequisite must have a diploma of an English university; England having found that only those who have imbibed the national spirit from their university training are trustworthy public servants.

When national spirit means high moral character, love of justice and fair play, then is a nation right in the endeavor to perpetuate it. This spirit do we claim for that of the true Anglo-Saxon, the "secret of his superiority." Do we not know that the duplicity, lying, forgery and all the category of devilish tricks, which made possible the present crisis in France, would be impossible in England or America? that the records of our courts could never be blackened with such rank injustice as was meted out to Dreyfus while the Anglo-Saxon spirit was still alive to cry "fair play?"

The words which Mrs. Ward puts in the mouth of Henri Regnault are memorable as embodying searching criticism—"No, we don't lack brains, we French. All the same, I tell you in the whole of that room there are about half a dozen people—oh, not so many! not nearly so many! who will ever make a mark, even for their own generation; who will ever strike anything out of nature that is worth having; wrestle with her to any purpose. Why? Because they have every sort of capacity, every sort of cleverness, and *no character!*"

This superiority of moral tone has been shown preeminently in our late "unpleasantness" in heroism unsurpassed in the annals of history, in victories won with phenomenal ease apparently, but in reality brought about by unceasing watchfulness, training, and that organized energy which is ready for any emergency.

Now if character is thus easily seen to be all-powerful in the domain of public life, it can be shown to be just as great a force in all a man's life-work. Hamilton W. Mabie says, "Superiority of any kind involves discipline, self-denial and self-sacrifice. It is the law of excellence that he who would secure it must pay for it. In this way the intellectual process is bound up with the moral process, and a man must give his character firmness and fibre before

he can make his talent effective or his genius fruitful. The way of the most gifted workman is no easier than that of the most mediocre; he learns his lesson more easily, but he must learn the same lesson. Every piece of genuine work which comes from a man's hand bears the impress of, and is stamped with the quality of his whole being; it is the complex product of all that the man is and of all that he has done; it is the result of his genius, his industry and his character."

Now it may occur to some of you that among so many words of felicitation, that amid the glad notes of this congratulatory refrain it is about time the minor key was heard. In truth, we cannot conceal from you those necessities and responsibilities which will for some time have their compulsive grip upon you, nor do we desire to do so. It is a pleasure to assure you, as a representative of the faculty, that the work laid out for you is not beyond the ability of intelligent and industrious men, but there can be no guarantee of success to those who are not assiduous, painstaking and conscientious in their preparation. The work which we call study is most engrossing in its demands, because it requires continuous and progressive labor. Each day has its peculiar duties so that there is very little time to make up arrears. A considerable and consistent sacrifice of what we may call the frivolities of life is required to attain a creditable measure of success in study, and it is absolutely essential that we do not deceive ourselves with promises about what we are going to do to-morrow. It is most true that life in the city offers probably the most abundant opportunities and provocations for neglect of necessary study, but these are things we must learn to face without yielding, until the charm of conscious growth and development in our work renders these seductions less and less powerful

Let me most earnestly request you not to postpone your beginnings. The only really easy way to success as a student is to keep right abreast of the course. The few steps that you may lag to-day become in time an almost insuperable difficulty, and your standing in your new student community depends upon your own unaided effort. Every gentleman must know what an impression for good, conscientious and painstaking preparation in class-room and laboratory must make alike on professor and fellow-student, and we hold that to obtain such a reputation is a worthy ambition. But we will set the goal still higher—we will ask every student to have his own

standard of excellence of attainment and to be satisfied with nothing that falls short of that standard.

It is to be remembered also, that the incidents to complete devotion to study are as beneficial as the direct results. He whose mental energies are so earnestly directed, and whose time is so occupied, will not be the prey to those temptations of immorality which may well render him powerless and ineffective in all his future work. It is true that no one can depend entirely upon occupation as a safeguard in this respect, but it helps. We concede that force of character and strength of will are also required, and it is pleasant to know that in the formative stage there are elements of our moral life which may be developed and strengthened to that perfection of virility that marks the complete and full-grown man.

This force and strength, I doubt not, many of you possess, and I rejoice to say that their acquisition is in the reach of all, and it is the duty of all to acquire them. The practice of moral self-restraint cannot be begun too soon nor followed too conscientiously and severely; for in this regard your temptations must be great, not only because of the inexperience and superabundant vitality of youth, but because many of you will now feel practically for the first time the freedom from restraint. Remember that this freedom brings with it freedom's responsibility, and you have now the opportunity to practice that noble self-restraint, the only restraint that can be valuable to you in your future life.

What I have said thus far concerns more directly your duty to yourselves than towards your chosen calling and towards the community, towards your fellowman, because its complete and successful performance will bring about such results as self-interest alone would dictate. You will pardon me therefore if, even at the risk of repetition, I insist upon loyalty to dentistry, which you have chosen as your profession. You cannot learn too early to dignify and ennoble that calling, nor to consider it well worthy the best you have to offer in ability, character and attainments. You cannot too seriously make it the object of a great and elevated enthusiasm. It needs among its recruits men of culture, of noble aims, of complete devotion.

To many the measure of success in life is a monetary one, but if that alone is the impulse that actuates you in the study of dentistry it were better had you chosen a business instead of a professional

career. For until you have learned that your professional reputation is more than any monetary consideration which business success may give you, you are not worthy to be considered a fit candidate for the degree of D. D. S. Until you have recognized the fact that as a dental practitioner you have stepped upon a loftier ethical plane, that you have assumed your place as the humble soldier under the blessing of Providence in the ranks of that devoted army whose mission is the lessening of human suffering, the alleviation of human misery, you have no conception of the ideal aim of your calling. Let your watchword take you beyond the limits of self to the noble ideals of professional success.

Then approach to your tasks for the coming year with these ideals clearly and constantly in view. Under their benign and stimulating influence your labors must be successful because consecrated. They will produce a mental and moral altitude of perseverance, persistence and endurance that must win for you a complete and noble triumph. They will give you the purity of purpose and the power of performance which shall send you out upon your career a credit to yourselves, an honor to your profession, and a blessing to mankind.

USE AND ABUSE OF MAT GOLD.

By E. N. Stump, D.D.S., Washington, D. C.

Mat or crystal gold is a pure gold precipitated on gold foil through the agency of nitro-muriatic acid and sulfuric or oxalic acid. The gold is added in pure state and the slower this is done the nicer will be the surface. It is then carefully treated by electricity.

The mat is an improvement over sponge gold, having no grit or harshness, which is not the case with sponge, as the latter is not smooth to the touch. Mat gold has come to stay, notwithstanding the wrecks and disasters it has caused through improper manipulation, as well as the false claims by some manufacturers.

One of the claims made is, that you can use mat gold in any tooth cavity without any preparation of that cavity. I heard this argument promulgated at a dental society meeting, and it was received without a protest. In all candor and honesty, are such teachings to be fostered? It is as essential to have a properly prepared cavity for mat as for almost any other form of gold. It is true that no

retaining pits are needed, but this is the case with some other forms of gold. To contour fully with mat gold will not save any time, as the condensing takes longer than for some other forms. The principal abuse with this form is in not properly preparing the cavities, and in using such large and heavy gold that it cannot be well condensed.

The uses of mat gold are many and most satisfactory. For conformity and adaptation to cavities nothing can equal it. At the cervical margins it is equal to tin; in other words, a tooth-saver. When treated properly it is soft and cohesive; all pure golds have that quality, and it should be appreciated. The complaints regarding pits and moth-eaten appearance are all due to improper manipulation.

In three hundred and forty-eight fillings Electra mat gold has been used without discoloration or failure in any way. For good color Electra mat takes precedence, but in other respects all the mat golds appear alike.

When inserting it do not tear and pull the gold, but place it where it belongs and press home gently and firmly. As regards specific gravity, I attained eighteen in a large molar with hand pressure and electric mallet.

Use mat gold judiciously, study your teeth and manipulation, and you will never regret the adoption of it.

PRESIDENT'S ANNUAL ADDRESS.

By S. S. Stowell, D.D.S., Pittsfield, Mass. Read Before the Massachusetts Dental Society, at Boston, June 1 and 2, 1898.

In reporting upon the several district societies I can speak only in praise. The year has been profitably spent in scientific research and advancement, the detail of which has been well carried out by the members of our district societies. It is a fact conceded by all that the district society has become a necessity to every progressive up-to-date dentist. Here we meet and take each other by the hand, breaking down the barriers of strife and burying the hatchet of controversy. Here we exchange our thoughts and ideas, imparting to each other the result of our experiences, experiments and researches, deriving mutual benefit thereby.

I will discuss only one of the district societies, one which I have always looked up to with the highest regard, but which, in my

opinion, has now fallen from grace because of a resolution of protest passed by that society against the program of this meeting, a prospectus of which was printed upon a postal card and mailed to the members of this society. You will remember special reference was made to an exhibit of "finished product" in dentistry of any character whatsoever, choosing for yourself any finished "operation," whether upon models or in the mouth of a patient, together with a short paper upon the subject of your exhibit. You were also invited to contribute for this occasion a paper upon any subject of your own choosing.

The resolution of protest reads as follows:

"Whereas, the members of this society have received a postal card from the president of the Massachusetts Dental Society, detailing a proposed plan for the program of the annual meeting at Boston, June 1; and whereas, said plan proposes an exhibit of finished dental products, as one of the most important features of the meeting; and whereas, the ambiguous expression "finished dental products" implies that the sole end and aim of dentistry is mechanical; therefore be it

"*Resolved*, That the Valley District Dental Society hereby protests against such a plan as being unprofessional and unscientific."

In justice to myself and to your executive committee, I will endeavor to explain our position in the matter. Referring to the ambiguous word "product," Webster gives the following synonyms: "Produce, production, finish, result, effect, consequence, outcome, work, performance, to make, to bring forth, result of the hand or intellect." This synopsis you will see gives considerable latitude in the use of the word "product."

In the first place, the announcement as sent out was submitted to our executive committee and heartily approved by them. In the second place, in reference to myself, the originator of the idea, I will say that I have practiced dentistry every day for nearly eighteen years, and in that time have found that much of my work has been of a mechanical nature, and my observation has convinced me that in spite of the importance of this branch of dentistry it has been and is sadly neglected and abused. While commending all scientific research, I consider a perfect dental operation in the mouth of a patient, whether it be filling, crown-setting, or a perfected dental bridge, the most important scientific work in which we can engage,

and surely as highly professional, and I must say that only as such should this work be undertaken. I honor the man for his honesty who frankly admits that he does not do mechanical dentistry, referring such work to a specialist, and I sorrow that so little is left in modern dentistry for him to do. I would denounce the man as ignorant and narrow who, through his ignorance and inability to do a fine operation in mechanical dentistry, protests against the honest efforts of others, classing such work as unscientific and unprofessional.

We know you can write a fine prescription for a "bug-killer," and we have heard it rumored that you could argue away a toothache, and cure an alveolar abscess with a porous plaster; but for humanity's sake, let us *see* what you can do to restore the keystone to a broken dental arch. Do you do no crown-work? Nor bridge-work? Nor plate-work? Do you restore no lost teeth? Nor parts of teeth lost by decay? Do you correct no irregularities? Do you not fill teeth? Do you place no splints upon broken jaws? If not, then the prescription blank and a pen is all you need to practice dentistry with. But if you would be loyal to the great trust imposed upon you, do *practical dentistry* and strive to elevate such work to a higher plain of scientific and professional standing.

May our highly professional brethren be forgiven for their indiscretion, and may we all, as a profession, strive to elevate each department of our noble calling. One object in bringing this before this society in this way is to emphasize the very great importance of mechanical work in dentistry; another object is for encouragement on the part of the members of the society, rather than discouragement in connection with work of every office. We appoint officers to do our work, as a society. We entrust the care of the society and its interests to them; practically they are conscientious in their work for us; it is a laborious one and the officers of your society should have encouragement and not discouragement for their efforts.

There are several things which might well be recommended for the benefit of this society. The one which I have just referred to is the greatest. The matter of returning manuscript to the secretary of the society immediately after the meeting is very important. Last year our report was delayed several months because we were unable to collect the manuscripts all together and get them in form for

our final work. If any have prepared manuscript for this meeting, let them see that it is in the hands of the secretary at the close of the meeting, or within the shortest time afterward. Then it may not come out as a piece of ancient history a long time hence.

DENTIST AS A THERAPEUTIST.

By E. A. Shillenger, D.D.S., Dalton, Mass Read Before the Massachusetts Dental Society, at Boston, June 1 and 2, 1898.

Some of the more enlightened people have come to look for those qualities in the dentist that the masses expect of a physician, and the former is no longer ranked with the barber as of old. This necessitates a knowledge of the general system, together with skill and ability. The profession is asking this question: To what extent are we justified in giving our patients systemic treatment? I intend to treat the question in a broad, liberal manner, and in concluding will answer the foregoing proposition. What do we understand by systemic treatment? Many would infer that it was treating a malady or disease by administering drugs, but such is not always the case. It is anything that will remove the trouble, whether it be due to typhoid germs or buckshot, an aching tooth or an ovarian tumor—each is would-be systemic treatment, and each requires the application of specific means.

Instances are often seen where patients are cured of stomach trouble by having artificial teeth inserted, permitting proper mastication and thus making the dentist the one to give systemic treatment. We all know the importance of resorting to drugs in many cases. How are we prepared for this? The studies of our dental colleges embrace the fundamental part of medicine, and any graduate who has improved his opportunities should be able to diagnose and treat any disease which may come within this domain. Do not understand me to say "exactly diagnose and cure all," for this is far more than the best physician can do. The studies are too familiar to you all to be repeated, both in the dental school and medical college, but let me call your attention to one important branch of anesthetics.

This chair is, as you know, one to be thoroughly understood by all practitioners. Prof. S. H. Guilford writes this in reply to my inquiry—"I know of no medical college, either in this country or Europe, where anesthetics are so thoroughly taught as in some of

our better dental schools." I have examined several medical catalogues and find no chair of this branch mentioned. Some physicians of whom I have inquired tell me that their knowledge of anatomy, physiology and general surgery gives them an insight into anesthetics. Why, then, cannot a dentist with the same knowledge be able to administer any drug? Are any of the medicines any more potent in their action or more dangerous in the hands of the unskilled than are our anesthetics? You would undoubtedly hesitate to have some of our dentists prescribe medicine for you; would you refuse to have them work on your teeth?

The profession has plenty of impostors and quacks, and medicine has its share of charlatans, so in that respect we are about even. Should a dentist be deprived of his right to administer drugs or give systemic treatment, with the knowledge he possesses of medicine, and the physician, with no learning or skill regarding dentistry, be allowed to extract teeth? I wish to call attention to a very lax feature on the part of our state boards. The dental student who has made the teeth and their diseases a special study must comply with the requirements of the law; he is met with legal upper cuts at every turn; while the physician who may know absolutely nothing about the teeth, and many of them have no more knowledge in this line than a layman, is allowed to get a few rusty forceps and sail in. And with no question from our board and no certificate issued. It is parallel with the case of the man or boy committing some crime without meeting with punishment, the matter having been hushed up because they happen to belong to a good family, while some unfortunate person lacking a royal pedigree is meted out the full extent of the law. Legislation has stopped the barber and the blacksmith. Why let the physician go on without proving his ability?

Students on leaving college are apt to turn their attention to mechanics and drop many theories as they are called. The medical man gets rusty also, like some of our druggists who pay more attention to the soda-fountain than to the pharmacopeia. There is as much need for a dentist's possessing a knowledge of the system as to understand the working of gold foil. On the other hand, the physician should understand the science of dentistry. Who can tell how much suffering and unnecessary pain is caused by ignorance? I will illustrate by citing a practical case that has been under my

care. A lady, about fifty years old, came to me for treatment after having suffered several weeks from facial neuralgia. Her physician had administered opiates and extracted all the teeth on the right side of the lower jaw, without affording any relief, the patient growing worse under the treatment. Early in my diagnosis I discovered that the teeth were not the cause of the trouble, as the pain was localized at the tip of the tongue and along the lingual border of the gums. I then looked for other causes. The tongue indicated indigestion and constipation, and the opiates apparently made matters worse. I prescribed a laxative and tonic, and the pain disappeared as if by magic.

The importance of a medical learning to one in practice cannot be overestimated, and the practitioner who does not understand the principles is handicapped; he is like a flute or violin player who cannot read music. The line between medicine and dentistry is arbitrary. Who can tell where one leaves off and the other begins? If the teeth and associate parts were in one state and the body in another some practitioners could not draw an abrupt line. Is this due to a destitution of knowledge or is it of too little consequence? There are scores of reasons why each profession should be studied as one. An essential one for the dentist is to be able to discern contagious and infectious diseases both for the safety of himself and his patients. Another good reason is that he ought to be able to hold his own in consultation, and not be a tool in the hands of the physician, and the physician should understand enough about dentistry to know who to send his patients to for work. Ignorance of the law excuses no criminal. Should ignorance of dentistry or medicine excuse any practitioner? Relative to the question at the beginning of this article, a dentist has a right and should be justified in giving systemic treatment to the extent of his ability; if he can treat a tooth or make a plate, that is so much to his credit; if he can go still further and administer drugs, so much the better, and those with which he is not familiar had better be left alone. The same applies to the physician, and when he is perfect let him criticise the dentist. Title amounts to little among us; the gentleman who stands highest in the profession has plain "Mr." prefixed to his name.

I am well aware of the fact that you gentlemen are kept busy attending to your office duties. Your time and work will not allow

you to occasionally take a course of medical lectures, but you can follow the suggestion of the late Professor Garretson, "Go to the books."

PHASE OF FILLING.

By A. J. Flanagan, D.D.S., Springfield, Mass. Read Before the Massachusetts Dental Society, at Boston, June 1 and 2, 1898.

For the last five years we have all read articles in the journals or listened to essays at meetings wherein was advocated the free sacrifice of tooth substance as a preventive of future recurring decay, and the use of gold as the par excellence filling material. The writer grants as an axiomatic truth in the beginning that, given a patient without ordinary feeling, abundance of time, ability to pay a good fee for the operation, gold would be indicated as the filling material, and anything but the free sacrifice of tooth substance would be an injustice.

As I have cogitated over these writings and have closely examined the illustrations showing two approximal fillings, with nothing but filling material in apposition, my conscience has smote me, and a something which might mean "you are a dishonest fellow" looms up in the distance. Filled with remorse, a resolution is there and then made that no longer will I be outside the circle of the good and the conscientious in dentistry. Perhaps to be candid with you, the spirit has so moved me that it seems the patient will never come that initiation may take place. At last a robust business man seats himself in the chair, and the beginning of the goodness starts. He has approximal cavities in the lower left first and second molars. Filled with the good I am going to do, the dam is adjusted with much labor on my part, and a copious flow of saliva and perspiration on the part of the patient. The engine is then put by the side of patient, ready for business, and not having my ear over the heart of my victim, I don't notice the intermittent beating. We haven't proceeded far with the excavating before patient shows signs of sliding his head into his stomach. However, after the lapse of much time, and the free use of dams other than rubber, the teeth are freely excavated. The patient sighs a relief as he sees the engine put aside, but finds he was only fooling himself when he feels the matrix, trip-hammer, sand-paper, trimmers, and so forth. After perhaps an hour and a half, for I don't pack a book of foil in twenty

minutes, the fillings are completed and he leaves. Now, sometimes he returns for more of my goodness—and sometimes he doesn't.

While I am feeling strong and elated over these grand results, one of my best (has-money) lady patients is awaiting an appointment. I have forgotten to mention that this patient has at times what some would call the "fidgets," and that in the past quite a few cement and gutta-percha fillings have been inserted when something else might have been better. In the strength of my conversion this is forgotten, and the necessity for one large approximal alloy filling, rather than cement, presents itself. The result may be described by saying, that in spite of all, even cataphoresis, cement is inserted.

The battle between "what should be done" proceeds however, with the odds strongly in favor of "what can be done." In about a week the latter has conquered, and we are lost once more from the good and select circle who excavate so thoroughly that failures are no more. I must here say that about this time the saw of a philosopher came to mind (and it has sharp teeth)—"When you can't control conditions put yourself in keeping with them." Many of my patients are decidedly animate beings, possessing all the sensibilities that you and I have when dental operations are being performed. Have you ever operated on the teeth of your brother practitioners, who *advocate* certain procedures in practice? It would be a revelation to you if not a revolution. Many crown and bridge-workers still wear plates; contour fillers have very flat fillings of cement and gutta-percha; strangest of all, many have diseased roots and abscessed teeth. About this time you will have the mote removed from your eyes, and will find that dentists prevaricate the good principles of dentistry in their own mouths.

Many things are grand in thought, if not in actuality. All of us remember enough of algebra to know there was such a thing as an equation. An equation in dentistry might read: skill plus the patient equals the operation, and not, the patient plus skill equals the operation. The crying need of dentistry to-day is either greater comfort for the patient in thorough gold work, or perfection in plastic filling, for it is fair to presume that plastic filling has not reached the perfection of understanding that gold has. Let me here say to you that in my practice gold is used where conditions allow.

Some two years ago my attention was called to the good results

following the mixture of amalgam and cement, in teeth which before had been filled with cement because of weakness of walls, want of undercuts, nearness of pulp, inability of patient to stand thorough excavation, and so forth. After a thorough investigation of this method it was adopted in certain cases, and a correct record kept of each filling. To the present time more than two hundred and twenty-five fillings have been inserted with decidedly gratifying results. I can assure you that the return of the patients for further operations, after one and two years' absence, has been awaited with misgivings. Eighteen fillings placed in teeth more than two years ago have been examined, and in all cases where pure amalgam was coated outside of mixture perfect results have been obtained; and in eleven cases where only mixture was used there has been a very slight wearing away, but in none of a harmful nature.

In using this method apply the dam or napkins to keep the tooth perfectly dry. You can use undercuts or not, as case may allow, though I assure yon that saucer-shaped cavities can be filled with success. If to contour you use matrix, place only enough of the mixture in cavity so that pure amalgam will come to the outside. In cases where discoloration is feared, a thin lining of pure cement may be allowed to harden the walls, when mixture can then be smeared over this. Where comparisons have been made, the discoloration from this method is far less than in ordinary alloy fillings—this can be accounted for only by tightness of filling. I have yet to notice that space found around ordinary fillings of amalgam. The use of cement as a lining and insertion of amalgam while cement is still soft has its uses even yet, but the one serious drawback of having the cement come to the surface is done away with by this procedure. The specimens passed are to show only hardness, and the force necessary to dislodge filling from saucer-shaped cavities with no undercut whatever. In amalgamating alloy bring to ordinary plastic consistency, and then, when a very small quantity of cement has been brought to a creamy, sticky consistency, thoroughly incorporate plastic mass and hasten to cavity. If cavity is such that pure amalgam cannot be attached to outer surface, it can be left without same, with the knowledge that it will do better service than pure cement. In closing, remember that this is no panacea for all cases, and that to-day brains fill teeth as the painters of old said they mixed colors.

Digests.

WHICH SHALL IT BE, THE EMPIRICAL OR THE SCIENTIFIC METHOD? By J. Leon Williams, L.D.S., D.D.S., F.R.M.S., London, Eng. Read before New York Odontological Society, Jan. 17, 1899. The task I have set myself to-night is that of initiating a work which is in the nature of reform. When I was with you two years ago some of the leading spirits of this society entertained me, and although in accepting this hospitality I expressly requested that there should be no speech-making, there *was* a little, in which I was forced to take a small part; and when, in response to my advocacy of more encouragement being given to original research work, I was asked to make some practical suggestion, I said I would think the matter over. Well, I have brooded over this subject during the two years that have passed since I was here. I soon discovered that there were grave difficulties in the way of bringing about the work I so much desired to see done. Before a man or a body of men can be induced to take forward steps, the need for taking those steps must be clearly pointed out. The first thing which becomes necessary in the effort to induce the dental profession in America to take higher scientific ground is to point out that its present position is not scientific, or less so than it should be. And the only possible way of doing this is to examine and analyze the utterances of its leaders, teachers, and influential members. You begin to see the difficulties now of my task. At the very outset I must take the risk of alienating the very men whose support I most need. But this is a position which every one engaged in work of this character has to face, and there is no dodging it.

I should of course be very glad if it could be believed that back of all I have to say to-night there is but one feeling, one desire, and that is for progress in our profession. If I sometimes use strong expressions, it is because I know that namby-pamby methods never succeed in movements of this kind. The man who would influence his fellows in any work of reform must hold the situation in a firm grip and chiefly consider the end in view. I have been told that in taking my present position I have probably overestimated the ideals of a great majority of the individuals composing our profession. But I have long observed that the man who sternly sets his face

against playing to the pit and gallery, and aims his efforts at the best intelligence in his audience, generally wins in the long run. And so I am not overmuch concerned whether or not there is an immediate response to my appeal, for I know that it will come; if not to-morrow or the next day, then after many days. If I could know that every student in our dental colleges would read this paper, I should be content. Their minds are free from prejudice and fixed habits of thought, and full of hope and enthusiasm, and that is the kind of soil in which to sow the seeds of progress.

One of the most delightful and original sayings of our dear friend and teacher, the late Dr. W. H. Atkinson, was, "There are many fools in the world, but the biggest is the one who says 'it cannot be.'" And he was right. *Anything can be* that has the support of twelve or even six earnest men who have once had a glimpse of the cosmic forces at work, and who have faith in themselves. They can move the world, for unlike Archimedes, they have found a fulcrum for their lever. It would be highly gratifying to me if those six wise and earnest men could be found in this society. The influence of this organization is world-wide, and it contains men with sufficient executive ability to carry this or any other movement, into which they would put their whole hearts, to a successful issue.

After the manner of the good, old-fashioned New England preacher, under whose ministrations I sat as a boy, I have selected two texts for my discourse this evening. The first is from an essay on Copernicus, by Edward S. Holden, and reads as follows: "*It is the merit of Copernicus that he reversed the ancient process of thought and inquired what hypothesis would fit observed facts, and not what additions must be made to an* a priori *assumption to represent observations.*"

My second text is from the writings of a man so great that he has been complimented by the conjecture that he was the real author of the works attributed to Shakespeare. The words I have selected are these: "*Now, among all the benefits that could be conferred upon mankind, I found none so great as the discovery of new arts for the bettering of human life. For I saw that among the rude people of early times inventors and discoverers were reckoned as gods.*"

The substance of what I wish to say in this paper is in the nature of a criticism and a plea; a criticism of the present scientific status

of the dental profession and of the attitude of a certain minor but influential portion of it toward the results of recent research work; a criticism of the loose ways of thinking, speaking and writing of which we are reminded at least a dozen times a year by the arrival of the monthly dental magazines; a criticism of the insecure foundations of practice as established upon the present basis, and a plea for a better state of things. While I have a keen and appreciative recognition of the great advances made by dentistry during the past twenty-five or thirty years, I have at the same time a deep conviction that the matters to which I am about to call attention are altogether discreditable to a profession which desires to be recognized as scientific both in spirit and in practice. And, further, I feel sure that the suggestions I have to make are not only of value but that they are really expedient—that the state of mind of the dental profession is, on the whole, ripe for the adoption of measures which will add greatly to its self-respect, to its efficiency, and to its status as a body of scientific men before the world. I have used the word "attitude" in my opening statement with special intent, for I regard the attitude of mind or the spirit in which any subject or problem is approached as of the first importance. There are many men of no great scientific or scholarly attainments to whose judgment I would submit a question involving consideration of original matters in preference to invoking the counsel of many of the professional teachers. The interest of the bias of the professional teacher is too often fixed in the direction of finding "what addition must be made to an *a priori* assumption to represent observations," rather than to inquire "what hypothesis would fit the observed facts." My first plea, then, would be for the cultivation of the true scientific spirit.

What is science, and what is it to be scientific in spirit? The simplest and most comprehensive definition of the term is "a systematized arrangement of natural facts." Any man who is engaged in observing the facts of nature and arranging a record of those facts with special reference to their related significance is, just to the extent of his labors, a scientific man. "Science," says one of our modern philosophers, "may be properly defined as logically arranged and systematic knowledge, or, more fully, that kind of knowledge which consists of facts carefully ascertained, accurately verified, and logically put together into a system." A fortuitous concourse of facts is not a science. Clinical observations do not constitute a science.

These things bear the same relation to a science that a heap of bricks or roughly-quarried stones does to a palace. They are merely the raw materials out of which the building is constructed. We must first have our facts in abundance, and then our science is constructed by a logical concatenation of the facts.

All true scientific work is an effort to learn those constant and persistent conditions which underlie all natural phenomena, and which we call natural laws. Our chief object in acquiring this knowledge is, or should be, its application to life. That life is highest which is lived in most complete harmony with the laws of existence. When man so lives the very sticks and stones are, as Emerson says, working with and for him. The end of natural science is the bringing of man into harmony with his natural environment. One might paraphrase an aphorism by Swedenborg, and say that all real science has relation to life. Our interpretation, you see, is sufficiently broad to cover all true science, and sufficiently rigid to exclude all pseudo-science.

And the scientific spirit is an attitude of mind well exemplified in the "first precept" of Descartes. "I took the firm and unwavering resolution," he says, "never to accept anything for true which I did not clearly know to be such: that is to say, carefully to avoid precipitancy and prejudice, and to comprise nothing more in my judgment than what was presented to my mind so clearly and distinctly as to exclude all ground of doubt." It was this spirit which led Galileo, when he had made an observation of the moon which seemed to stand in contradiction to facts already in his possession, to write out the observation and place it in a pigeon-hole, where it remained for twenty years before a discovery was made which harmonized it with the previously acquired facts. A smaller man would have thrown himself with great energy into the work of discovering a theory which would reconcile the contradictory facts. But your true scientific man is serene, and content to first of all accumulate facts in the field under observation. He knows perfectly well that in the nature of things a methodical or orderly arrangement of facts will sooner or later suggest the coordination or generalization which will explain all.

One of the most striking illustrations of this is found in Darwin's discovery of the law of natural selection. When he returned to England in 1837 he says that it seemed to him that, "by collecting

all facts which bore in any way on the variation of animals and plants under domestication and nature, some light might perhaps be thrown on the whole subject. My first note-book was opened in July, 1837. I worked on true Baconian principles, and without any theory collected facts on a wholesale scale. . . . I soon perceived that *selection* was the keystone of man's success in making useful races of animals and plants."

In another department of science we have an eminent example of the rich results which follow the method of accumulating facts direct from nature. It has been stated that Edison has made, or has had made and recorded under his instruction, more than one hundred thousand original observations from nature. Up to the present time he has probably not been able to make practical use of half of these observations, but he knows that a use for any one of them may be found at any moment. But the vast practical adaptations of electricity to human use which he has made have grown almost entirely out of his own first-hand studies of nature. And I believe that he has somewhere said that it has cost him almost as much, in time, to unlearn the errors he had imbibed from books as to accumulate his own original store of facts. One is reminded of that famous saying of Hobbes. "If," he says, "I had read as many books as other men, I should have been as ignorant as they are." All great teachers and investigators discourage the use of books as primary sources of knowledge. Agassiz would have none of them for his pupils. And just hear what Huxley says upon this point: "If the great benefits of scientific training are sought, it is essential that such training should be real; that is to say, that the mind of the scholar should be brought into direct relation with the fact; that he should not merely be told a thing, but made to see by the use of his own intellect and ability that the thing is so and no otherwise. The great peculiarity of scientific training, that in virtue of which it cannot be replaced by any other discipline whatsoever, is this bringing of the mind directly into contact with fact, and practicing the intellect in the completest form of induction; that is to say, in drawing conclusions from particular facts made known by immediate observation of nature."

In contrasting the book-made man with one who has studied direct from nature he further says, "Not only is he devoid of all apprehension of scientific conception, not only does he fail to attach

any meaning to the words 'matter,' 'force,' or 'law,' in their scientific senses, but worse still he has no notion of what it is to come into contact with nature, or to lay his mind alongside a physical fact and try to conquer it, in the way our great naval hero told his captain to master their enemies. His whole mind has been given to books, and I am hardly exaggerating if I say they are more real to him than nature. He imagines that all knowledge can be got out of books, and rests upon authority of some master or other."

That expression "to lay the mind alongside a physical fact" is to me one of the happiest in the voluminous writings of this great teacher and investigator. To "lay the mind alongside a physical fact," to grapple with it, to feel half-baffled and beaten back again and again, and then at last to conquer—there is a joy in that which has but little in common with the dilettante delights of our mutual-admiration societies. The scientific method of observation and deduction bears about the same relation to ordinary methods of observation and deduction that a modern battle-ship does to an ancient galley. Ease and efficiency in the application of power is the great practical result of the scientific method. Says Hoffman, "The nineteenth century is preeminently the age of science, and it is an age of the greatest progress for that reason. For the more scientific our knowledge becomes in any sphere of investigation, the more easily and completely can it be applied to the advancement and elevation of the race."

To attempt at the close of the nineteenth century a defense of science and the scientific method would seem in the nature of work of supererogation. But I think we shall find it is not quite so. The position of a great many men in this respect reminds me of the powers of observation of the old farmer's crows. They knew the difference, you remember, between one man and a gun, and two men and two guns. They were even shrewd enough to understand, when three men went into the watch-hut and two came out, that another remained. But there their powers of observation ended. They could count to three, but they never got further than that point. And so it appears to be with many in their power of application and indorsement of the scientific method. They can count up to three, but that represents the utmost stretch of their scientific imaginations. Beyond that they are like a timid swimmer getting beyond his depth, and they strike out lustily for the shore.

If I put the question broadly and ask, "Is it desirable that our practice as dentists should, so far as is possible, be established on a scientific basis?" there would not be a negative reply. But when we begin to analyze this question and descend to particulars, the case is altogether different. Not only do we find that there is actually but little scientific foundation for a large part of our practice, but when an effort is made to introduce more exact methods it is met by very marked evidence of hostile feeling. The exact methods of science seem peculiarly irritating to many, probably because these methods have such a rapier-like way of puncturing long-cherished delusions of the self-styled man of practical common sense.

We have suffered long from the arbitrary rule of this man of common sense, and I for one am ready to rebel. I think him a tyrant, and a dishonest tyrant at that; because when he wants an opinion of any value upon any subject he never goes to one of his kind, but always to the man of uncommon sense or the expert. What is this much-vaunted common sense at its best? I should say it is a compound of about equal parts of very ordinary observation, deep-seated prejudice, and crude metaphysics. Your man of common sense stands on the level of all common things, and he has always chiefly occupied himself in appropriating, without thanks, the valuable things of life which have been provided by men of uncommon sense. He had much better stick to his leather and abandon the *rôle* of critic.

Another enemy of all true scientific progress is your person of authority. He has acquired notoriety in some special field chiefly because he can "count to three," which arithmetical feat is beyond those who support him. He is always to the front when a new generalization based upon new facts in his particular field is brought forward. He sometimes presents an outward show of deference, but he has an obvious inward determination never to yield a point. Observing him, one is constrained to believe that the force of the most evident facts is entirely lost upon those who are firmly intrenched behind old and fixed habits of thought. Long-continued concentration of mind and purpose in a fixed direction undoubtedly at last renders the intellect incapable of perceiving the true relation of things when revealed. "The best security for fixedness of opinion is," says Bagehot, "that people should be incapable of comprehending what is to be said on the other side."

Emerson, with characteristic humor, thus scores the ultra conservative man of authority: "Each savant proves in his admirable discourse that he and he only knows now or ever did know anything on the subject: 'Does the gentleman speak of anatomy? Who peeped into a box at the custom house and then published a drawing of my rat?' Or is it pretended discoveries of new strata that are before the meeting? This professor hastens to inform us that he knew it all twenty years ago, and is ready to prove that he knew so much then that all further investigation was quite superfluous." Still another enemy of scientific progress is the credulous individual, —he who is ready to believe anything that is new to him. He represents the type which goes to swell the ranks of theosophy, faith-healing, and all the great army who believe that everything is like everything else, and that nothing is quite identical with something; in other words, all who fail in their discrimination of the relative values of different facts. One of the great distinguishing features of the scientific method lies in this power to appreciate the relative value of facts. We begin, as Darwin says, by the wholesale accumulation of facts. We collect everything bearing upon the subject in hand that we can find. We recognize that certain facts are more intimately related than others and that some have greater value than others, and we classify our facts according to their relationship and values. And herein lies just the difference between this method and all others. I suppose there is no error in the world which has not some fact as a foundation, and all errors consist in the exaggeration of certain facts out of all relationship to other facts which modify them, and in the forcing of conclusions which the facts do not legitimately warrant. This is the empirical method. The origin of the term, which was not originally one of reproach, dates from the Alexandrian adaptation of Greek medicine, although the empirics claimed justification for their doctrine in the teaching of Hippocrates. Its salient feature was the rejection of the study of anatomy and a general abandonment of inquiry into the causes of things. Their famous "tripod" of principles, or the sources from which they claimed a knowledge of medicine could alone be obtained, were clinical observation, recorded observation, and judgment by analogy, methods which are certainly to be commended so far as they go. But the difficulty arose in those ancient days precisely as it does now, viz., in the interpretation, or rather the misinterpretation,

of the facts observed. The whole weakness and danger of the empirical method, using the term in its original sense, lies in the ever present tendency to force conclusions or to found deductions upon incomplete or insufficient data. A good example of this is found in the teaching that because the softening of enamel is a matter of clinical observation, *therefore* the phenomenon must be due to some *intra vitem* change in the tissue. Here was the operation of two principles of the "tripod," clinical observation and judgment by analogy. But the fact never contained the conclusion. It was a pure assumption. This was just the point when Descartes, the father of the scientific method, stepped in with the famous precept quoted, to "comprise nothing more in the judgment than what was presented to the mind so clearly and distinctly as to exclude all ground of doubt." The first steps in the empirical and the scientific method are the same. Both begin with observation, and from observation proceed by processes of reasoning. The reasoning process is largely one of inference. Now, these inferences may be correct or false, and the special feature of the scientific method is the verification by various means of the conclusions reached by the reasoning processes. This work of verification, in its most complete form, is carried to the point demanded by the conditions of Descartes' precept.

Many ludicrous mistakes by some of the most noted men in history might be quoted to illustrate the dangers of the empirical method. No one would deny that St. Augustine, for instance, was a great thinker, and he had no doubt made some superficial, accidental "clinical" observation which led him to assert that he knew from his own experiments that the flesh of the peacock was so favored by the Almighty that it would not decay. He has told us nothing, so far as I am aware, of the nature of the experiments upon which this conclusion was founded, but we may be sure they would hardly be accepted in any modern laboratory for experimental research.

The empirical method was a stepping-stone to the scientific method, and with the evolution of the latter the former should have passed away. The scientific method includes all of value that there ever was in the empirical method, and adds so greatly to our power of reaching truth that there is much reason for wonder that the ancient habits of thought should find defenders and followers to-day. And is it true that this is so?

Is it true that the results of scientific research meet in the dental

profession with open hostility, and with what is worse, apathy and inability to appreciate the significance of those results? Is it true that the dental practice of to-day is largely founded upon empiricism? Is it true that our dental literature is saturated to the core with pseudo-science, and with ancient metaphysical habits of thought that have come down from the time of the Greek sophists and from the theology of the middle ages? We shall see. To go not very far back in our literature, let me ask how was Dr. Miller's work received when the results of that brilliant series of investigations were first published? I well remember the intense antagonism with which the dean of one of the leading dental colleges of America opposed those views and demonstrations. It is said that Dr. Miller's conclusions are now accepted in a general way; but as I happen to know, this means little more than that an attitude of open hostility has passed into one of indifference, at least so far as the logical conclusions in matters of detail of much of his work is concerned. His book is praised as a classic, but is it read and studied to any considerable extent by the profession? If you want a conclusive answer to this question, ask the publishers what is the average annual sale of the book. The attitude of a great majority of the profession is in this respect an indorsement of one of Pudd'nhead Wilson's maxims, which is that a classic is a "book which people praise and do not read." It was undoubtedly praise of this sort which led the humorous philosopher to elsewhere exclaim, "A dozen direct censures are easier to bear than one morganatic compliment." Our current literature supplies the strongest proof that much of the praise bestowed upon Dr. Miller's work is in the nature of "morganatic compliments." Have the gentlemen who insist upon believing that enamel possesses some mysterious hypothetical quality which they call vitality, and which they say resists the causes of caries, accepted the teachings of Dr. Miller, who showed that caries could be produced artificially in dead enamel? They must also have observed that the progress of caries is often somewhat retarded when the pulp of a decaying tooth dies. Is this because a dead tooth possesses more "vitality" than a living one? These and other positions which are still vigorously maintained are not only opposed to Dr. Miller's teaching, but to all that is best in the results of modern scientific research in kindred fields. We have also seen more recently a somewhat apathetic welcome given to another of the most

valuable pieces of scientific work ever done for the dental profession. I refer to the researches of Dr. G. V. Black. Commenced in the true scientific spirit and carried out in the most orderly and rigidly exact method, the results are unimpeachable. I know of but one man who has undertaken to test this work by scientific methods. Mr. Charles S. Tomes, a man of whom it is hardly necessary to say that he is as well qualified to undertake such an investigation as any one living, has been over a considerable portion of the field traversed by Dr. Black. And he found, greatly to his surprise, that the results of his investigations on the whole gave an emphatic indorsement of Dr. Black's report. If I may be permitted to speak of my own work as frankly as I would of another's, and without any of that affectation of modesty which is so often used as a thin veneer to cover up the coarsest egotism, I should say that it supplemented and carried to completion in certain directions the work of both Dr. Miller and Dr. Black.

Concerning the exciting cause and progress of dental caries, there is now not a missing link in the chain of evidence from beginning to end. With regard to the significance of the facts presented, there is substantial agreement between Dr. Miller, Dr. Black, Mr. Tomes, and others who are qualified to speak. The question which you gentlemen of the dental profession have to consider is this: Are you prepared to set over against the results of this work, which has been conducted according to the best scientific methods of the day, the mere opinions of men who, although eminent as teachers in the profession, have never undertaken anything in the nature of scientific work to disprove our position, nor are they able to bring a single fact to bear against it. The utmost they have succeeded in doing up to the present is to misrepresent our work and our position, and then to proceed to belabor and tear to pieces this scarecrow of their own making. Let us come down to particulars and see if I am fully justified in making these statements. It would be an easy task to go over the dental journals for the past few years and select a column bearing upon this subject, but I shall confine myself to some of the more recent issues. In the *Items of Interest* for June, 1898, there is reported a meeting of the Central Dental Association of Northern New Jersey, during which one of the oldest college professors in our profession delivered himself as follows: "Dr. Greene Black tells us that all teeth are composed of the same relative proportions of

organic and inorganic substances. Wonderful! I will ask, fellow Hornets, if you ever heard of more than one analysis of enamel? Not poor enamel, not good enamel, but enamel. Who has ever heard of more than one analysis of dentin? Who has ever heard of more than one analysis of cementum? These analyses were made in the old days of Fox, by Pepys, almost a hundred years ago. And it has always been so until by some hocus-pocus Dr. Greene Black found that dentistry thought (?) that hard teeth had an excess of inorganics and that soft teeth had an excess of organics! It seems strange that he did not recognize that soft teeth have been called 'chalky' from time immemorial, and that they have been called so because dentistry thought that chalk is an organic material!" Any one who is fond of solving enigmas may undertake an analysis of that remarkable piece of criticism. I have no comment to pass upon it, but I will do what I can to give the widest possible publicity to what an old college professor has to say about such work as Dr. Black has been doing for the past few years.

Of a somewhat different order, and demanding more serious consideration, are the criticisms passed upon Dr. Black's work in a discussion before the Odontological Society of Pennsylvania, reported in the June number of the *International Dental Journal* for the current year. The work of one of our oldest dentists is there quoted to say that "the electrical condition of the teeth is responsible for decay." It seems that "he has written several interesting papers in which he says that it is impossible to estimate how far this condition changes the character of the dentin; and he maintains that it is an abnormal condition that makes the teeth yield to the influence of the acids of the mouth." One can hardly avoid drawing a deep sigh of discouragement in the effort to deal adequately with this sort of thing. It is entitled to a certain amount of respect, and yet it is all so foreign to the scientific spirit and method of working that the situation is much like the old problem put to us in our childhood days: "If a bushel of wheat sells for a dollar, what will six yards of muslin cost?" There is no relation whatever between one part of his problem and the other part or parts. He first brings in a purely hypothetical condition as a premise; he then says that it is impossible to tell what the effect of this condition is. If it is impossible to tell anything about it, of what possible significance can it be? "It is an abnormal condition,"

he says, "that makes the teeth yield to the influence of the acids of the mouth." This is merely a plain statement of the obvious, and there is considerable evidence that several well-known teachers and college professors who took part in this discussion are in agreement with the wisdom of the teaching.

I suppose almost since men began to think. they have made the mistake of connecting an unrelated inference to a self-evident truth and thereupon founding a specious argument; the self evident truth in this instance being the statement that teeth decay because of abnormal conditions, and the unrelated inference the theory that the active cause of decay is electrical action. Now this problem of tooth-decay seems to some of us a comparatively simple one. Let me state it in the form of two or three propositions. If you take enamel from the most perfect type of teeth, say from the teeth of carnivorous wild animals, and place the lactic acid of fermentation in contact with this perfect enamel, it will be destroyed, will it not? Or, to put the proposition in another way, given a gram of perfect enamel and given sufficient lactic acid to produce a new chemical combination with that amount of enamel, will not the combination inevitably occur when the two substances are brought in contact? We show you that lactic acid is formed by certain microorganisms in contact with enamel. We show you many appearances of decaying enamel which are identical with appearances produced by the artificial application of lactic acid out of the mouth. And yet you go on talking about the absence of a certain vague vital force or certain electrical conditions of the mouth as being responsible for dental caries. We ask you to abandon this position, or come forward and astound the scientific world by your announcement of the discovery of some hitherto unknown principles of chemistry.

If I were searching for a particularly severe criticism upon some of the positions taken up during the discussion referred to, I should find it in a pronouncement by one of the gentlemen who took part in it. After making a number of general statements relating to the matters under discussion, he said: "We cannot go over all that ground and prove our points, but we can have our theories and believe them." I half suspect that this was a very neat and sly thrust at the general looseness of statement which was so much in evidence on that occasion. The opinions expressed were confessedly founded upon clinical experience, although evidently not upon the

facts observed, but upon their interpretation of the facts. And have we not all history before us to show that such interpretation may be made to teach just the opposite of what is true when the observed facts are not interpreted by some exact scientific method or principle? Did not men walk up and down the earth from the days of creation until comparatively recent times, believing and teaching that our little globe was the center of the universe, and did not their daily observations (clinical experience) ever and ever more confirm them in this position? Did not the president of the Western Union Telegraph Company tell Edison that quadruplex telegraphy was contrary to all experience (clinical observation), and in the nature of things impossible? Has not almost every great discovery been opposed on similar grounds and in a similar manner to that taken up by these gentlemen, who "*cannot go over the ground and prove the points, but will have their theories and believe them?*"

For the fiftieth time, perhaps, during the past dozen years the old question of the vitality of enamel was again brought forward at this discussion, and the consensus of opinion was that enamel must be a vital tissue. We have statements that there is organic matter in enamel, and that this has been observed to become "disintegrated" during typhoid. The gentleman who made these statements further says, "If vital changes take place in any tissue certainly that tissue is not dead." This is another statement of the obvious; but what is the evidence that there ever are vital changes in enamel? "I believe that enamel is living," says another college professor. And he continues, "There are some things we cannot measure with the yard-stick; there are certain things we cannot demonstrate with crucible or test-tube." If this means that there may be certain forces and conditions which science has not yet recognized, I should be among the last to deny such a statement; but then, what bearing does this have upon our manipulation of purely material things as we understand them to-day? Is the yard-stick to be discredited as an instrument for measuring material things, and shall we abandon the use of crucible and test-tube in our efforts to find out the qualities and relationships of material things? How is it possible to base any scientific procedure upon hypothetical conditions which are admittedly beyond the reach of science? We have never proposed to investigate the unknowable or the unthinkable. We are simply trying to estab-

lish a solid basis of scientific facts upon which we may work intelligently, instead of empirically, as those must work who "*cannot go over the ground and prove their points, but will have their theories and believe them.*" I wonder if any of the gentlemen who are so much given to talking about this mysterious, intangible vital force have ever carefully examined their own opinions about it. The use of the word has no significance whatever except as a convenient short-hand expression for the *ensemble* of all the chemical and mechanical forces of the body. To speak of it as something apart from these is, as Huxley long ago pointed out, like speaking of the "aquasity" of water as something apart from the material qualities by which we recognize this substance. The origin of all this so-called vital force, as Tyndall so ably demonstrated more than twenty years ago, is from that great reservoir of *inorganic* force, the sun. To speak, then, of the vitality of enamel is to speak of alleged chemical forces which are operative in this tissue producing chemical changes through the functioning of organic matter. Stripped of the mysterious and the obscure, this is the whole point of the question. Is there any evidence that such changes occur in human enamel? Not a single fact has ever been brought forward to show that such changes take place, and there is the strongest possible evidence against such an assumption. Where do the chemical changes occur by means of which tissues are formed and regenerated? Where is the bone molecule and the dentin molecule elaborated and constructed, or where are the initial steps taken which unvaryingly lead to the formation of bone or dentin, if not in the formative organs of these tissues? Can periosteal bone be formed when the periosteum is destroyed? Or can dentin be formed when the dentin pulp is destroyed? If these questions must be answered in the negative, on what is based the opinion that an enamel molecule may be formed, or in other words, that the enamel may be regenerated, that either formative or retrograde molecular changes may occur after the destruction and disappearance of the enamel-forming organ? There can be but one possible answer to such questions, and that is, "*We cannot go over all that ground and prove our points, but we can have our theories and believe them.*" Probably the fascination of speculation lies in the infinite possibilities which it presents. And, then, it is so much easier to speculate than to investigate. If you have an active imagination, you may command the admiration of a

wide circle by your brilliant suggestions of what *may be* true. And the more far-fetched your hypothesis, the stronger will be your hold upon the wonder-loving multitude. Nor will they lose confidence when your speculations are shown to have no foundation in fact. "When Professor Buckland, the eminent osteologist and geologist, discovered that the relics of St. Rosalia at Palermo, which had for ages cured diseases and warded off epidemics, were the bones of a goat, this fact caused not the slightest diminution in their miraculous power." There are not a few indications that many in the dental profession prefer the stimulating beverage of theory to the plain but pure water of scientific truth. "Have we not had enough of science for a while?" asks one gentleman, as though he desired less science and more speculation.

"Science is now the dominant fad," says another well-known dentist,—"science arrayed against experience and clinical life, and marshalled by a set of men the bulk of whom have no genius for dentistry." I think we may safely leave the latter part of this statement to the logic of events for its answer, while we inquire who it is that is arraying science against clinical experience. Certainly no one that I know of, except the gentleman quoted and those who think like him. I know of no science which is not founded upon observation of facts. Science *is* facts or truth in orderly or systematic arrangement. Even the able editor of the *International Dental Journal* says, "The dental profession will not be converted to Dr. Black's deductions or to Dr. Williams' peculiar polemical methods, so long as they confine their work to the laboratory and hold as practically valueless all clinical observation." I suppose there is nothing to be done except to continue to protest against this sort of misrepresentation, and to call upon the editor to point out when and where I have ever made the slightest attempt to discredit any clinically observed fact. But the truth of the matter is these gentlemen have not correctly stated their criticism. Their real grievance is that men who have formed a methodical or scientific habit of observing and recording phenomena should refuse to accept their haphazard and altogether improved interpretation of the facts, and should have the audacity to put forward other interpretations which are in complete harmony with the facts. I say again to these gentlemen, who have so persistently attempted to discredit our work, it is you and you alone who are trying to array so-called clinical

observation against science. I cannot help wondering why it is that those who do not wholly agree with us, or who think it best to hold the matters treated *sub judice* for the present, should find it so very difficult as they apparently do to correctly represent our position when it is stated in the plainest possible language. I was astounded to read in the recently published report of the chairman of the Section on Anatomy, Pathology, and Surgery of the National Dental Association, that I held views opposed to those of Dr. Cryer on the vascular supply of the tooth-pulp, and to the text-books which represent the blood-supply of the pulps of the teeth as coming from the dental arteries. Let me quote in this connection what I really said. Referring to the nerve-supply of the pulp, I wrote, "There is no doubt about the distribution of nerve-fibers from the inferior and superior dental nerves direct to the pulps of the teeth." A little further on in the article I say, "The blood-supply of the pulp also arises from two sources, vessels passing from the pericementum *and from the medullary canal* into the pulp." Not a word, you see, in opposition to Dr. Cryer or the text-books, but merely a suggestion that there is, in addition to what has always been accepted, a further source of nerve and blood-supply. I have also recently seen myself quoted in the dental journals as authority for the statement that the existence of the so-called dentinal fibrillæ has never been demonstrated. Truly, it seems that one must be very alert in these days if one is to contribute anything toward the advancement of knowledge in the dental profession and save one's reputation for accurate statement at the same time.

It is noticeable that a large part of the opposition to the new view comes from the older men in our profession. They seem to feel that a change of opinion means a nullification of the work of a lifetime. But I regard that as altogether a wrong position. The condemnation comes not in having taught error, which was really not error so long as nothing better was known, but in clinging to that error after it has been shown to be such. I commend to them this saying of Marcus Aurelius, "If any one can convince me of an error I shall be very glad to change my opinion; for truth is my business and nobody was ever yet hurt by it. But he that continues in ignorance and mistake, it is he that receives the mischief." We would at least wish to see the older men in our profession content to rest with work well done. We would gladly honor them

and ask them to accept our full and cordial acknowledgment of the faithful way in which they have marched forward under great difficulties. They have made wonderful progress, although handicapped in many ways and carrying heavy burdens. But must the universe stop with their passing? Must the deluge which ends all come upon us as they go? Is it not our business also to put the hand of progress forward a little on the dial of time? Why can they not accept the situation gracefully, and frankly admit that they have not exhausted the possibilities of heaven and earth? But whether they will do this or not, nature smiles upon them serenely, and, turning the page of her great book to a new problem, calls out the younger class.

The exigencies of the occasion and not lack of material prevent me from giving any further illustrations of the main points of my thesis, but I am sure you must admit that I have presented quite sufficient evidence as to the unscientific nature of much of the substance of the discussions of the present time as they occur in our leading dental societies.

It would hardly be possible to suggest measures of reform in the field I have covered, or sketch a plan for the promotion of original research without giving some attention to that phase of scientific work foreshadowed by the second text at the head of this paper,—viz, that which has reference to the discovery or invention of materials, appliances and methods for use in the practice of our specialty. So long as dentistry in its practical application includes so much that is in the nature of a mechanical art as it does to-day, just so long will there be opportunities for invention and for the discovery of new materials and new methods of application and procedure. Let us, without any beating about the bush, come at once to the heart of this part of our subject. What shall be the rights and privileges of the discoverer and inventor, and what shall be the attitude of the profession toward those who contribute in this way to the advance of our calling? Let us set aside all purely conventional and arbitrary ways of looking at this important question, and consider it solely from the point of view of what is right —from the standpoint of common honesty. The attitude of an influential portion of the profession to-day is hardly in keeping with the sentiment expressed by that great master mind of the Elizabethan era from whom my second text is quoted. Inventors

and discoverers in dentistry are certainly no longer regarded as gods, unless it be that a god is a being who is expected to be always doing something for humanity and getting nothing in return for it. A curious and somewhat vague formulation, partly written and partly understood, has arisen in our profession and is called *a code of ethics*. Those who subscribe to this so-called "code" maintain that it is unethical to patent inventions for use in dentistry and to receive an income from such inventions. Inventors and discoverers, when they have produced anything of value, should at once, according to the "code," freely bestow all the results of their labors and investigations upon the profession. Now ethics is the science of human conduct, of human duties. As a citizen I have my duties to the state or the city. But this relation, like all human relations, is reciprocal. The city or the state also has certain duties to me. It would be very unethical for the state to receive money from me in the form of school taxes and then refuse the benefits of the public schools to my children.

Emerson in his essay on "Compensation" says, "Benefit is the end of nature. But for every benefit which you receive a tax is levied. He is great who confers the most benefit. He is base—and that is the one base thing in the universe—who receives favors and renders none." There is rich matter in that for those to reflect upon who teach that the inventor should give all that is best of himself to his profession while his profession gives him nothing in return. "*That*," says the sage of Concord, "*is the one base thing in the universe.*" We have occupied an anomalous and thoroughly dishonest position on this question of inventions from several points of view. We have practically said to the inventor and to the investigator, "While you are devoting your days and nights to the invention or discovery of some useful thing, I will spend my time in increasing my bank account by getting what I can out of my practice or in recreation and pleasure, for I very well know there is a sentiment abroad against the taking of patents. I will therefore improve my worldly position, enjoy life, and remain in the more fashionable circle which disdains to invent things; and when your invention is completed and introduced, if it has any value I shall be able to utilize it without paying for it. I shall be able to exploit it among my patients, and very probably make more out of it than you who brought it into being." This thing has

actually been done with many valuable inventions. And it is called high-toned ethical conduct. The humbug and the hypocrisy of it all is positively sickening.

And how does this matter work out practically? Just to the extent that the teaching of the right to appropriate the results of the labors of others prevails, the inventive faculty will cease to be exercised among dentists, and will be turned over completely to the dental manufacturer. There are very few men who will forsake the natural responsibilities of life for original work in any direction when there is no hope of reward held out to them. The present situation is demoralizing in more ways than one. It is not only discouraging to men of genuine talent, but it tends to foster the introduction of a great array of spurious inventions and devices, and that patenting of methods of working against which Dr. Ottolengui is just now waging a vigorous crusade. There has never been a time in the history of dentistry when so many worthless and often harmful remedies and devices were being foisted upon the profession as at this moment. And the remedy for all this is entirely in our own hands, as I shall presently show you. Another extremely inconsistent phase of this question is that it is *not* considered unethical to copyright a book and receive an income from such a work, not even when the substance of the book is entirely made up from material supplied by the inventor, who is not permitted to receive anything for his invention. You may lie in wait for the inventor just around the corner and write up the result of his discoveries, and patent or copyright your stolen work, and make what you can out of it. It is quite ethical to do that! Could any position be more immoral or more deserving of scorn?

Whatever steps are to be taken, if any, for a better organization for the scientific interests of our profession, this department of invention must be included in our plan. In truth, it everywhere so runs into and permeates every phase of dentistry that we cannot dodge it if we would. There are a great number of useful inventions and devices constantly coming forward which have cost their originators but little in time or money. It is proper enough that these should be freely bestowed upon the profession for the benefit of all. It is proper that any invention or discovery should be freely given to the profession, if the inventor or the discoverer is pleased to act in this liberal manner. But the profession has no right to demand

this of any one. It is immoral and unethical to do so. And furthermore, it is inexpedient. The most effective way to prevent valuable inventions from falling into the hands of speculators, who have no interest in the well-being of our profession, is to establish a fund for the monetary recognition of works and devices of considerable value. It is the most simple and effective way of protecting ourselves to do this.

We have thus far been dealing largely with our subject in a general way. Let us briefly consider matters a little more specifically. We are engaged in the work of saving human teeth. Our efforts are aimed at the prevention and cure of those diseases which if allowed to run an undisturbed course end in the destruction of the dental organs. Now, as bearing directly upon the present scientific status of the dental profession, I wish to ask two questions. First, to what extent have we made progress in preventing diseases of the teeth, and, second, to what extent have we established a basis of agreement as to the best method of treating those diseases when they occur? Here are questions, you see, which involve the very *raison d'être* of our calling, and they need only to be placed before you to show how poorly established our scientific basis really is. As a profession we have made little or no progress in the prevention of decay. Now I firmly believe it to be quite within the reach of modern scientific methods to demonstrate how dental caries may be largely prevented. Are we really sufficiently imbued with the spirit of altruism to desire this? That remains to be seen. In the meantime, what have we accomplished? The preservation of the teeth for a certain temporary period. What is the average length of that period? A few years ago a Western dentist, whose name I cannot now recall, undertook a careful estimate of the average time that tooth-stoppings arrested decay. I recollect that period was placed at five years. I have for a long time been giving close study to the rate of progress of dental caries, and I find the rate is not so rapid as has generally been supposed, because there is a primary stage which had been overlooked until my studies of decay of enamel were published. I think the primary and secondary stages would average about five years. We see then that the average time which a filling will arrest decay corresponds very closely with the time that is required by the microorganisms of decay to produce a new lesion. I submit this is not a result of which we need feel so very conceited.

Of course, in cases where the conditions under which acid-forming bacteria work are entirely removed, as they may sometimes be, and the work of filling is made *absolutely perfect*, decay in the region treated is permanently arrested. But we all know that such cases constitute but a small proportion of what can practically be accomplished. There are but few patients who will endure the tedium, pain and expense of such work, and, I may add, there are but few men who can do *absolutely perfect* work when the few patients are found who will submit to it. And so, while desiring to give the fullest possible recognition to all that has been accomplished, I assert that we have nothing to show which can justify complete content with present achievements. We have made some progress toward demonstrating the antecedent conditions of dental caries, but work along this line has been opposed at every step, and one can scarcely take up a dental magazine without finding some expression of doubt even as to the active cause of this disease, while for its prevention there has been but little systematic work done, and that little has taken no firm hold upon the profession. There is a hazy idea abroad that germicides have a tendency to prevent decay of the teeth, but who knows how long any given solution of hydronaphthol, formaldehyd, or chinosol must remain in the mouth to completely destroy the acid-forming micro-organisms? Evidently your so-called practical man takes but little interest in this phase of our duty to our patients. He is quite content with things as they are. Tooth-tinkering is good enough for him. He knows how to convert a human mouth into a perfect Aladdin's cave of gleaming jewels. But what about our tooth-tinkers; are they agreed as to the best methods of tinkering teeth? Certainly not. They do not believe in scientific work, without which it is impossible to find out how even to become the best sort of a tooth-tinker. One says that amalgam is the material *par excellence* for this work, while his neighbor exhausts the possibilities of language in heaping execrations upon that substance. If one elects to make a moderate use of amalgam for filling teeth, and inquires for this much-abused and much-lauded article, he is offered his choice of a hundred or more. Nobody knows which kind is best except the manufacturer. Dr. Black carried out a series of scientific investigations in this direction, but some who have long been before the profession as purveyors of amalgam say

that this sort of work is of no account. It is the same with oxyphosphate cements. There are a hundred sorts offered, good, bad, and indifferent. All share and share alike. Nobody knows which is best except the man who has a certain brand to sell. And we dentists, gentle, patient, sheep-like individuals that we are, go on using whatever is pushed under our noses and pay—aye, there's the rub—we pay ten times as much for inferior and worthless articles every year as would be required to place this phase of our practice upon a basis of agreement and certainty. Is it not about time that we began to act together and to act like sensible men? Take any department of practice that you please and the conditions are much the same. Some of the ablest men in our profession say, for instance, that inflamed pulps, if taken during the early stages of inflammation, may always, or nearly always, be treated, capped, and saved alive. Others are certain that this is a pernicious practice, and that a pulp which has once been the seat of inflammation, especially if caused, as it usually is, by the approach of caries, should always be devitalized and removed. Some say that calcareous deposits are always the first step in the formation of pyorrhea alveolaris, while others affirm that such deposits are not present in many cases of the disease, and when present are one of the results rather than the cause of the disease.

Nearly thirty years ago, when I attended my first dental convention, they discussed these questions which I have raised. They were discussed long before, and they have been discussed ever since. Once a year some of you charter transcontinental trains to attend the national convention to talk over the same old problems. You talk about them at more frequent intervals in the state and district conventions. Do you not think the time has arrived when it would be well to consider whether some small part of the many thousands of dollars spent each year on these functions might not be advantageously used for the promotion of a little scientific work, which would probably settle many, perhaps all, of these questions.

Let me call your attention specifically to some of the problems which await such scientific investigation as shall raise practice out of the present empirical methods: 1. An inquiry into the cause and best methods of treating chemical erosion. 2. An inquiry into the causes of the disease or diseases which attack the pericemental

membrane, with best methods of treatment. 3. An investigation which shall comprise a thorough comparative test of the germicidal power of such substances as are provided for the destruction of the microorganisms of the mouth, and the adaptation of the best of these germicides to use in dentifrices. 4. An investigation for determining the chemical differences, if any, between human saliva and the saliva of various animals which do not suffer from dental caries, and also for determining the comparative inhibitive power of various salivas with reference to the development of microorganisms. 5. A microscopic investigation which shall involve the preparation by well-known operators of a large number of cavities in extracted teeth, and the filling of some of these cavities by different methods of using gold, and filling others with amalgams from the formulas of Dr. Black and others, and then examining and photographing through the microscope the polished margins where metal and tooth-substance meet; and afterward grinding sections of these specimens to ascertain to what extent enamel affected by the acid of caries has been removed from the margin of these cavities, especially at the cervical margin of approximal cavities. 6. A thorough comparative test of the various oxyphosphate cements in the market.

Let me give a broad, outline sketch of what I would regard as a scientific method in the testing of these cements. I would make a dozen or twenty mixtures of each cement, in which there should be varying proportions of powder and liquid, determined by accurate methods of weighing. These mixtures should be formed into cylinders of say three-quarters of an inch in length and one-third of an inch in diameter. This form or something approximating to it would, I think, be found the best for the various tests. I would submit the cylinders of the various mixes to crushing tests, to a grinding test in which the cylinders should be forced against a wheel by means of a spiral spring, the wheel being driven by some power capable of being perfectly graduated or determined. This grinding test would probably be the most important test for this form of tooth-filling material, as it would accurately determine the actual resistance to wear, a much more important matter than resistance to crushing power. I would further test these cements with reference to the action upon them of the products of acid and alkaline fermentation. Out of a hundred or more cements

tested we should probably find a half-dozen superior to the others. These superior cements would be adopted by the entire profession with great benefit to our patients and to ourselves. Can you imagine anything better calculated to induce the inventor or the manufacturer to reach the highest possible point of perfection in his productions than the knowledge that these productions must be submitted to the most searching scientific tests?

Here, you see, is the practical application of the scientific method to a few of the most intensely practical problems of our every-day work. And who will undertake to maintain that our methods of practice as applied to any of these subjects which I have mentioned are at present founded upon any other than an empirical basis? To-day it is *my* opinion against *your* opinion upon almost every question connected with operative dentistry. Now we come asking for something better than this. Surely, if it is one of the important duties of the profession to protect the *public* against quackery, it is of still greater importance to protect *itself* against useless and harmful things. We therefore ask that the profession shall take up and exercise its own inherent prerogative of passing judgment, not individually and without investigation, but collectively, through its chosen representatives and after the most careful and rigid scientific examination, upon all instruments, appliances, materials and remedies which are brought before it.

I have do doubt there are individuals ready to come forward now and say they cannot support such a movement as I am advocating, because it seems to interfere with the liberty of the individual and the freedom of competition in trade; and that furthermore an element of great danger might be introduced by the possible opening of a way for favoritism to certain manufacturers. There are several things which may be said in reply to such possible objections. I we feel that the manufacturing companies and all who wish to make and sell articles for our use are more likely to work for our own best interests than our own chosen representatives would be, then it would certainly be better not to take up this branch of the suggested movement. If we believe that competitive trade methods are good for dentistry, then we should raise no objection to secret remedies and the engaging of dentists in the manufacture of trade articles. On the other hand, let us all go in for the commercial system and carry selfish methods to their logical conclusion. If we do not wish

to do this, then let us be consistent in pursuing the other course. Let us stop crying Good Lord and Good Devil.

But, really, I firmly believe that such a movement as I am advocating would be in the interests of the manufacturing companies and all who have the wish to present articles of real merit to us. The losses to the manufacturers arising from the production of expensive articles which prove to be unsalable must be very considerable. The practical indorsement by the entire profession of any article would insure at least a moderate and paying sale of that article. Both invention and manufacture would, I believe, be greatly stimulated by such organization as I am advocating. I am not going to enter my voice in the cry, which is popular in certain quarters, against the manufacturing companies. They have done far too much for the dental profession to be deserving of anything in the nature of wholesale criticism, and as the profession is at present organized I frankly admit that the manufacturers are often our teachers. If you are content with this, let it go on. If not, pray let me make a few practical suggestions for a forward movement. All that I have to present for your consideration in this direction can be summed up in seven words,—viz., concentration of effort and organization of work. Just think for a moment of what is being wasted in the way of money and effort in our profession. Suppose an army was to be sent out on a campaign with such lack of organization as we have. Utter defeat and irretrievable ruin would inevitably await it. There is an enormous amount of energy and individual effort for progress in our ranks, but a very large part of it is wasted for lack of proper organization. Now, suppose a committee or a department were to be created in the National Dental Association, to be known as the Bureau of Original Research Work and Records, or by some such name, with suborganizations in every state, which should report to the central organization six weeks in advance of each annual meeting; and suppose there were a thousand dentists in the United States who had sufficient interest in the progress and the general position before the world of our profession to contribute five dollars each to a fund for this organization, and another thousand who would give two dollars and fifty cents each, and five thousand more who would give one dollar each.

Here we have less than half of the dentists of this country represented, and even with the small individual tax mentioned we have

a fund to start with of twelve thousand five hundred dollars. With that fund and the organization suggested, more real benefit would come to the profession in five years than would come in twenty-five as organized now, and the fund mentioned represents but a small part of what is now wasted every year in the ill-directed efforts toward the same end. But suppose the seven thousand dentists cannot be found to contribute this proposed fund for original research work; suppose we take the ultra pessimistic view that not a dollar can be raised for such a grand work; still, almost incalculable benefits can be secured by an organization which would insure concerted and harmonious action, instead of individual and often antagonistic action, as along present lines. A general plan of work could be arranged by the national committee and distributed among the state organizations for carrying out. As an illustration, twenty-five or thirty men might be selected to keep a detailed record of a certain method of pulp-capping; twenty-five or thirty might keep a record of a different method, and others, if you like, might be selected for a third method. And so we might go through with the whole list of dental operations, and this method would in a few years secure to us much greater harmony in our work and something approaching a scientific foundation for it. I cannot repeat it too often, our interests are too individual, and therefore too diversified and often antagonistic. We need something to knit us together, something to arouse the enthusiasm of the individual, and to make him see clearly that he is acting for his own best good when most active in the interests of the profession as a whole. We are tired of watching the making of patchwork, weary of seeing men play at doing things, like children who build up toy houses of cobs or fagots and then kick them over in mere wantonness or for the pleasure of building them up again. We are wasting our energies in meandering along crooked paths that come from nowhere and lead nowhither. Let us organize and unite and build a new road, a great scientific highway, as the old Romans built their wonderful roads in Britain, straight down the valleys and over the hills, direct from point to point.

We have been hammering and clamoring for I know not how many years at the door of Medicine, asking, beseeching, begging for recognition as medical specialists; we give ourselves all sorts of names, oral surgeons, oral specialists, stomatologists, and what not, in the hope that we may gain a nod of recognition from the world

that shall imply we are somewhat more than what is generally conveyed by the term " dentist;" we have done nearly everything except the right thing, the dignified, manly thing. Now, if we will go to work in real honest earnest, we shall soon enter into our rightful and desired position without asking permission of any of the older organizations. The man who feels that he is master of the situation asks no favors of anybody. Just to the extent that our profession produces work worthy of recognition by the great scientific world, that recognition will come quickly and generously. I do not wish to see this chosen profession of ours content with a lower level than rightfully belongs to it. I want to see it take its place among the first, and therefore I say, Come, let us join hands, and let all petty jealousies and small ambitions be shamed into silence in the presence of a noble enthusiasm for real progress which shall fill each and all of us.—*Cosmos, March, 1899.*

* * *

EXTRACTION OF THE FIRST PERMANENT MOLARS, A BENEFICENT CONSERVATIVE OPERATION. By W. Mitchell, D.D.S., London, Eng. Read at Twenty-fifth Anniversary Meeting of American Dental Society of Europe, at London, August 3–6, 1898. The points I wish to bring forward for your consideration are: Why and when shall extraction of the first permanent molars be performed? I purpose by my deductions, based upon experience, to convince those who have heretofore been opposed to the extraction of these teeth, that we have a practical and legitimate means of preventing to a great extent the ravages of dental caries, especially that form produced by lateral pressure, and securing a more comfortable and serviceable dental armament by more perfectly safeguarding the interproximal space than is possible by flat and imperfectly contoured fillings, and later by affording patients a more perfect masticating surface; and last but not least, the satisfaction of securing to patients in the most practical way probable immunity from constant and prolonged dental operations during the greater part of their lives.

Briefly stated, my proposition is this: Where the first permanent molars are in a condition of decay or retrogression, from whatever cause, that suggests the probability of their being a source of continued trouble to the patient, I would strongly urge their removal, provided the operation be performed at the right time. In order to

secure the desired results it is absolutely necessary that the child be constantly under the supervision of its dental attendant, with whom then rests to a very great extent the condition of the mouth and the subsequent condition of the teeth. Nearly twenty years ago I first gave this subject my attention, and while I had but little opportunity at that time of putting my ideas into practice, as time has gone on I have been fully convinced by results that the operation is a good one, conferring as it does a lasting benefit to my patients and a great deal of satisfaction to myself.

Age at Which to Extract.—This must be determined by the dentist, according to the requirements of each individual case. My experience is that the age and development of the patient varies somewhat, my cases varying from ten and one-half years to twelve years and possibly a few months, depending usually upon the accelerated or retarded general development of the child. We have all seen cases of dental precosity that were difficult to account for, which accentuates what I have previously said as to the necessity of deciding each case upon its individual merits.

I would strongly urge that this operation be performed from four to six months prior to the eruption of the second permanent molar. The time can be determined by the eminence and rounding of the superimposed tissue over this tooth; an idea can also be formed as to the near or remote approach of the second permanent molar by puncturing the gum with a fine, sharp-pointed exploring instrument after cocain has been applied. This means of diagnosis is rarely required, as the objective symptoms incidental to the eruption of a molar tooth are usually a sufficient guide when to operate.

After deciding upon this operation, it is imperative that all four of the first permanent molars be extracted, even though one or two be quite sound. By this means alone can the best general results be attained. By operating at the time suggested, the second permanent molar will travel forward during the process of eruption, and its antagonizing tooth will do likewise, and the result will be the securing of a more perfect articulation than where no regard as to time or completeness is paid in connection with this operation.

Effects of Extraction.—Some criticism will undoubtedly be advanced as to the possible modification of the antagonism of the teeth, contraction of the dental arch, shortening of the bite, etc. I can say only that the cases I have operated upon speak more elo-

quently than I can as to these points. In no case have I noticed any change in the features or contour of the face (this is undoubtedly what would occur were the dental arch contracted by the extraction of these teeth), but this is prevented by the second permanent molars rapidly assuming the position of the extracted teeth. As to any material change taking place in the occlusion of the second and third molars, thereby decreasing their efficiency, I have not yet discovered. We all know that an ideal articulation is practically one of the creations of our own imaginations. What may be an ideal to one person would not be to another, and ideals change with time and circumstances. What may be considered an ideal dentition at twelve years of age might be an incongruity at forty, hence time, circumstances and surroundings must be considered in connection with our ideal dental armament. Therefore I contend that the nearest approach to an ideal condition of the mouth at any age is where its dentition is in the best condition to resist decay, to be in the most effective condition for mastication, and at the same time to be the least possible trouble to both patient and dentist. If my contention is correct, then the operation which I advocate answers these requirements better than any other method of procedure with which I am acquainted.

Cases from Practice, Case 1.—Mr. A., aged eleven years, first inferior molars imperfectly developed, large anterior approximal cavities, grinding surfaces honeycombed by decay, first superior permanent molars imperfectly developed but not decayed. Child fairly well nourished, growing rapidly. Family history from a dental standpoint bad—father averaging more than one filling per tooth, has several artificial crowns and several extractions; mother wearing full upper and lower artificial dentures; elder brother had two or three fillings in all teeth except two, which were crowned; elder sister practically a *replica* of the foregoing. After considerable argument I prevailed upon the father to allow the extraction of the four molars; he demurred very much at the extraction of the two upper ones, but I insisted on the extraction of all or none. Eight years after I put a small gold filling in a fissure in the second left superior molar, and three years later a similar filling in the opposite tooth. I found the articulation practically perfect. These were the only dental operations required in eleven years, and to-day he is the only member of his family who has good teeth and a really

comfortable dentition, although apparently of the same type as his father.

Case 2.—Miss B., aged eleven and a half years, child well nourished, growing rapidly. Condition of teeth: ten fillings in various stages of efficiency in the four first permanent molars, with cavities in the approximal surfaces of the second left inferior bicuspid and distal approximal surface of first left inferior bicuspid. Family history from a dental standpoint not good on maternal side; do not know condition of father's teeth. Mother's required much filling; brother about two years her junior has required twenty fillings in his teeth during the past seven years. This latter patient, I may say, was not under my care when I could have extracted his first permanent molars to advantage. Another brother, three years her junior, required five fillings in his first permanent molars in five years and four fillings in other teeth. A still younger brother, for whom I extracted the first permanent molars, has required six fillings in the other teeth in five years, while Miss B. has required only five fillings since the extractions. I would say in respect to these children that they are all well nourished, live in the country, are well developed and all well above the average height, and their teeth are apparently of the same type and quality.

Case 3.—Miss D., aged about ten and a half years. When upper molars were extracted patient went away to school, and while there had operation completed, but only after allowing some months to elapse. Family dental history bad on paternal side, father wearing full upper and partial lower dentures. Condition of teeth prior to operation imperfectly developed and rapidly breaking down. During five and a half years after extraction of upper molars but two small fillings have been required on palatal surface of superior lateral incisors. The delay in extracting the lower teeth has modified the occlusion as compared with the other cases, leaving a large undesirable interproximal space. Present condition of the mouth very good.

Case 4.—Miss E., aged about eleven years, required ether, as the teeth were so badly broken down. Family history from a dental standpoint bad, father and mother having worn partial artificial dentures for the past fifteen years, elder brothers and sisters especially requiring continuous dental attendance. Patient of highly nervous temperament and advanced mental development for her

years, rendering the proper preparation of cavities for filling practically an impossibility. The first permanent molars I had filled many times with cement and gutta-percha, also with copper amalgam, only to see them break down again about the fillings and at other points. The remaining teeth are of a frail, delicate nature, and owing to the natural arrangement of the upper ones cavities which are a *replica* of the father's have formed on the approximal surfaces of the incisors which I have filled. The record of the case shows that in about four years thirteen fillings were required in the four first permanent molars, owing to the causes already mentioned, as well as nine fillings in the other teeth. The present condition of the mouth is better than it has ever been, but not quite satisfactory, owing to the great tendency of the teeth to disintegrate, occasioned by their frail development.

To summarize in regard to this operation, I would say it has proved a good one in my hands, looked at from any standpoint, as I feel that our first duty to our patients is to put their mouths in the best and most lasting comfortable condition possible, securing to them at the same time the most serviceable and effective masticating surfaces, in conjunction with an immunity from the requirements of constant subsequent dental operations. These are *not* specially selected cases, and have, I hope, demonstrated the possibilities of this operation, *when performed at the right time*, to be as claimed for it in the title of the paper. This operation is *not* of universal application, but in careful hands and under proper conditions will benefit the patient more, and probably reflect as much credit upon the operator as any with which I am acquainted. At the risk of repetition I will finally urge *the necessity of making the operation complete at the right time.—Items of Interest, Jan. 1899.*

* * *

OBSERVATION OF THE RELATION OF THERMAL IRRITATION OF THE TEETH TO THEIR TREATMENT. By Louis Jack, D.D.S., Philadelphia. Read before Pennsylvania State Dental Society, July 13, 1898. The purpose of this paper is to make it appear that in several disorders of the teeth one of the pathological factors is the increased impatience to thermal irritation which they exhibit, and that by careful observation of the effects of fluctuations of temperature in either direction we may be guided in the treatment and be able to form a favorable or an unfavorable

prognosis of any given case. In various papers upon the conservative treatment of the dental pulp I have called attention to the importance of considering the sensitiveness of this organ to thermal impressions. I did not then know the value of more careful observation of the degrees of heat in either direction, or how considerable is the variation of irritated pulps with different persons; neither had I acquired definite knowledge of the variation in the rate of temperature, both high and low, which is disagreeable to the healthy teeth of different persons.

The teeth, like the other tissues of the body, are subject to irritation on subjection to heat above the normal maximum point of tolerance and by reduction of temperature below the normal minimum rate of tolerance. The surface of the body gives impression of pain when the temperature is raised to the neighborhood of 130° F., and is irritated by the continued application of a temperature of 40° to 45°. These rates apply almost equally well to the mucous membrane of the mouth as to the exposed skin. These temperature rates are nearly uniform, except as habit and the influence of vital force may modify the impression.

In addition to the presence of the pulp, the ultimate distribution of the terminal branches of the canaliculi forms a plexus, the *stratum granulosum*, which appears to be the anatomical element of the tooth that most immediately takes cognizance of thermal extremes, and which on the occurrence of irritation of the pulp manifests increased impatience of the disordered tooth upon the application of reduced or of elevated temperatures. The shock of a cold application is more quickly noticed than would be the case if the reaction were from the pulp, as the substances of the tooth are poor conductors of heat.

The degree of heat not unpleasant to the healthy teeth may be designated as the normal rate of the individual. This varies with different persons to a considerable degree, as heretofore stated; while some will endure without irritation a stream of water at 135° applied to an isolated healthy tooth, others are unpleasantly affected by a temperature of 120°. The effects of cold temperatures excite impatience when applied to healthy teeth to a greater degree relatively to the mucous membrane than they are affected by heat; that is, they much better tolerate 130° than they bear 40°. In this connection it is significant that the earliest manifestation of irritation

of the dental pulp is intolerance of cold temperatures, and that it is an invariable indication of excitation of the nerves of the pulp as the consequence of commencing hyperemia.

As to the normal cold rate, some persons tolerate without impatience the continued application of a stream of water at 40°, and in some instances I have found vital teeth so unimpressionable that the vapor of ethyl-chlorid would not cause pain. Others have pain at 70°, and I have found a case where the normal cold rate was 78°. These are extreme examples, but the normal rate is so various from the tests I have made as to require in the treatment of disturbed pulps the ascertainment of this rate of the sound teeth. For this purpose I usually select the lower incisors, or any tooth of which the dentin or cementum is not exposed.

To ascertain the normal rate it is generally required to isolate the tooth with rubber-dam. With reference to treatment, the normal becomes a control rate; the lower rate I designate by the — symbol, and the higher by the + symbol. The following table shows several variations by actual tests.

	Below 100°.	Above 100°.	Range of tolerance.
1. Mr. D. P., — 58 + 134.....	42	34	76
2. Mrs. W. H. J., — 55 + 130 ..	45	30	75
3. Miss T., — 63 + 131.....	37	31	68
4. Mr. E. C., — 71 + 120.....	29	20	49
5. Miss I. M., — 76 + 124.....	24	24	48
6. Mrs. M.. — 78 + 000.....	22	30	52

It easily appears significant from these data as a guide in the treatment that when we compare a control rate of — 58 + 134 with the control rate of — 71 + 120, how important the ascertainment of this basis is in each case presented. As the aim in each instance must be to reduce the ascertained rate of the disturbed pulp to an approximation with the control rate, it is evident that more care is required, and the prognosis is less certain in the latter than in the former example, since the latter indicates a greater degree of constitutional tendency to thermal reaction. More caution is necessary in such conditions to perfect the case during the treatment from exposure to shock in either direction, and the treatment must be more assiduous. Furthermore, the determination of the control rate appears valuable in the treatment of ordinary cavities when the pulp is not nearly reached, since if the range of tolerance is small there is greater liability to hyperemia following metal fillings than is the case where the range of tolerance is large.

The phenomenon of sensitivity of dentin as the consequence of the chemical irritation of the exciting causes of caries upon the protoplasmic elements of the dentin must inevitably induce slight hyperemia of the pulp. This is indicated by the changes which take place in the canaliculi contiguous to the carious part, as well as by the deposition of tissue in the pulp-chamber opposite to the carious cavity. It has not yet been determined whether this slight hyperemia increases the reaction of the teeth to thermal impressions. I have not been allowed to make the necessary observations to form a conclusion. In one case, where the open and cleansed cavity gave reaction at —60° + 110°, when it was filled with a non-conductor the reaction of the tooth was at — 80° + 130°. In such tests there exists the liability to error, since the temperature tests extend their influence to the area surrounding the margins of the cavity, which cannot be eliminated from the evidences of pulp irritation.

The difficulty is enhanced when, as is frequently the case, the surface of the cavity will not tolerate a temperature in either direction of 3° from the blood rate. A pulp which would be impatient of variation from the blood heat of so slight a difference would be in a very serious condition. It is evident where a carious cavity presents so great reaction as this there is danger of irritation of the pulp. It hence follows that where there is a small thermal tolerance it is plainly indicated that great care be used to protect by lining the pulp-wall with some means to reduce conduction.

More significance is to be attached to a high minus rate than to a low plus rate, for the reason that the danger of exposure to low temperatures is greater than is the liability of the teeth being subjected to heat, since food and fluids are not often taken at temperatures above 120°, whilst it is difficult to protect from temperatures below 70°. It is for this reason that when pulps are exposed or are hyperemic from any cause, the patient does not complain of heat until the disturbance has dangerously developed. On this account also, unless the adviser makes careful tests, he remains ignorant of the possible intolerance to heat. In each case of pulp-disturbance it will be found, in addition to marked impatience to abstraction of heat from the tooth, there is intolerance of heat at some point below the control rate.

The determination of the control rate and the temperature rate

of a disturbed tooth, while very simple of application, requires care to secure reliability and to exclude errors. Two vessels, one containing cold water, the other hot, or two water taps, are necessary. By graduating some of the cold by the hot to about 70° F.—the tooth being isolated, and the cavity closed with cotton or any non-conductor—a stream from a syringe is thrown upon the enamel for a few seconds, the nozzle being held near the tooth to prevent loss of heat of the water in passing through the air. The temperature may then be successively lowered to the degree where reduction of the heat of the tooth induces some discomfort. This is the minus rate. Then by increasing the heat of the water gradually the plus rate is ascertained. In this connection some persons are susceptible to differences of sensation of less than 2°. Where the normal control rate is known and the disturbed rate, the treatment may be conducted.

Hyperemia and inflammation of the pulps of teeth are induced by a variety of causes. (*a*) These are exposures or approximate exposures of the pulp; (*b*) the conditions which follow the conservative treatment of the pulp; (*c*) secondary sensitivity of the teeth where the proper precautions have not been taken to prevent this occurrence; (*d*) the filling of teeth with thermal conductors where the pulp approximates the cavity; (*e*) severe mechanical shocks; (*f*) pericemental inflammation when this condition approaches the apices of the roots.

The general cases requiring treatment are *a* and *b*. What I have to further consider is particularly applicable to these classes. The first requirement is to protect the organ so far as possible from temperatures beyond the range in either direction of the limits of toleration. Secondly, to make continued application of aconitum until the symptomatology indicates either a progress toward recovery, or in the direction of severe inflammation or necrosis of the pulp. Aconite, so far as I am aware, combined with a slight degree of counter-irritation, is the only therapeutic means which we have to effect control of the pulp when it is desirable to make a profound impression upon it, and where the conditions are such as to lead to the probability of its recovery. In my experience topical applications directly to pulp are of little value toward its restoration after it becomes actually exposed. If salvable, I find it is safer to give an immediate protective capping and a non-conductive stopping.

The applicability of aconite consists in its property of depression of the sensory nerves, and that when locally applied it is a powerful paralyzant to the sensory nerves and acts more particularly upon their peripheral endings. It has been claimed that aconitum has an influence over the capillary circulation, but this has not been established. If it be so, the action is probably to be found in its primary influence over the sensory nerve terminals.

The application of aconitum in the mouth requires care to avoid its distribution beyond the local region to be brought under its influence. To effect this, and at the same time to produce some counter-irritation, I combine the tincture with chloroform, equal parts. A pledget of cotton to cover an area about the size of the first phalanx of the index finger is saturated with the formula, and then squeezed between layers of muslin or absorbent paper until it is comparatively dry. This is to prevent any escape of the medicament into the mouth, to which it is irritating, or to the throat, where it is extremely distressing. It is then placed upon the gum over the affected tooth, and retained there for twelve to fifteen seconds. It is of the greatest importance to first rub from the gum the coating of mucus, which would otherwise interpose against the absorption of the aconite. It is also better that at the moment of application the surface be dry. I am thus minute in these directions, for in the carefulness of the treatment much of the result depends.

In marked cases the applications should be made on alternate days, or even each day during aggravation. In the latter it should be applied on the buccal side one day, and the next day upon the lingual aspect. As amelioration takes place, the periods between the applications are lengthened. In the cases where treatment is given at the outset of the occurrence of disturbance, one or two applications are often sufficient. In neglected cases many may be required. In all instances the temperature tests are the guiding factor, and go along with the other attention the case may receive.

In the text-book on operative dentistry of Dr. Kirk, I have carefully defined the limits wherein there is prospect of safe conservative treatment of disturbed pulps, and have pursued this line of treatment within the limits therein defined, and regard the results to be as satisfactory as attend the treatment of other amenable diseases of the teeth.

It may be of interest to illustrate the above outline of treatment by a citation of some cases.

No. 1 is the case placed first in the table given above. First left lower molar pulp exposed and capped April 10, 1894. Control rate — 58° + 134°. After a disturbance continuing several days the patient applied for treatment April 18, 1898: temperature rate 74° + 116°. April 19, rate — 71°. 21st. + 120°. 24th, — 73° + 120°. 27th, — 69° + 127°. Returned May 16, — 60° + 134°. Discharged.

No. 2. Left lower molar pulp fully exposed and capped on distal surface February 5, 1873 (twenty-five years). Mesial surface also similarly treated May 12, 1891 (six and one-half years). On November 16, 1897, appeared with pulp-disturbance. It was found that the temporary filling of the mesial aspect had lost a portion, exposing the edge of the cap. Some infection had probably taken place; recapped it and commenced the treatment outlined above. Control rate, — 55° + 130°. Temperature rate of tooth, — 73° + 108°: 16th, — 76° + 112°; 18th, + 118°; 19th, — 74° + 120°; 20th, — 74° + 124°; 27th, — 67° + 128°; 29th, — 66° + 130°. Discharged. At a subsequent interview there was quiescence.

To show that bad cases may be improved, a serious one presented where the patient objected to devitalization. No control rate taken: Lower bicuspid. April 22, 1898, — 73° + 100°; 23d, — 75° + 106°; 25th, — 72° + 108°; 27th, — 72° + 108°. Returned from a journey June 24th, — 76° + 120°. Tooth was then quiescent.

No. 5 in table. Control, — 76° + 124°. Upper molar. For several weeks there had been some reaction to cold and reflected pain, with a temperature rate — 85° + 108°, which became, under treatment — 80° + 120°, which was as near the control rate as could be attained. Here was a commencing range of tolerance of only 23°, which was increased to 40°, this being within 8° of ordinary tolerance of her sound teeth. Pulp remains alive.

It will be observed generally, as in the above-cited cases, when the plus rate commences to rise the impatience to cold somewhat increases. In No. 4 of table, where the control rate is — 71° + 120°, I have capped three pulps which have succumbed. This also occurred with No. 6. As in the latter, I capped two pulps, since devitalized. This would indicate that when the range of tolerance is as small as 50° it is questionable whether conservative treatment of the pulp offers any chance of satisfactory results.

A summary of the course of disordered pulps may be considered as follows: The diagnostic peculiarity of a disturbed pulp is impatience of temperature beyond, in either direction, the control rate of the healthy teeth. Hyperemia of the pulp is indicated by decided pain being caused by the abstraction of heat, along with reflected pain, mostly in the ear. Continued hyperemia and inflammation of

the pulp is indicated by the effects of the application of ten to twenty degrees of heat below the control rate. In hyperemia of the pulp there is usually some amelioration by gentle heat, even when the teeth may be pained by an additional acceleration of heat. Inflammation, or long-continued hyperemia, is temporarily relieved in the same manner by moderate cold, to a certain point in course of disturbance, where response to cold ceases and when heat occasions unbearable pain. At this point pulp is soon necrotic by the establishment of a static condition of its circulation.—*Cosmos, Jan. 1899.*

* * *

HARDENING AND TEMPERING OF DENTAL INSTRUMENTS. By Alfred Beauchamp, London. As it is absolutely necessary to "harden" a steel instrument previous to tempering, the hardening mediums or fluids will be first considered—1. Water. 2. Oil. 3. Mercury. Water may be used for hardening all ordinary steel tools, such as are used in the dental laboratory; it is, however, not advisable when a tool has to bear much strain, unless it be one of stout dimensions. Oil (preferably sperm) should be used for all fine instruments, as excavators, pluggers, etc., which will be subjected to a great degree of pressure, and in which a considerable amount of elasticity will be required. Mercury may be used for hardening enamel chisels (in recommending this, however, the writer does so solely on the grounds of having obtained personally very satisfactory results therefrom).

One of the most convenient vessels for containing these is the ordinary jam-pot, which should be filled to within half-an-inch of the top; a smaller gallipot may be used for the mercury, and it may be noted that as this will be found to be easily warmed by the dipping in of the hot instruments, it is advisable to cool it occasionally by pouring into a bowl of water.

Having placed these on the bench conveniently to hand, the next consideration is the flame. The ordinary luminous flame of a No. 5 fish-tail burner with a good pressure of gas is preferable to a Bunsen burner, the flame of which is circular and comparatively very unsteady, whereas the former, in addition to steadiness, has on account of its flat shape the further advantage, that by holding the instrument across or at right angles to it, the heat may be very readily concentrated on any given spot. The fact that the blue portion has a lesser degree of heat than the luminous portion will

also be found advantageous, more especially in tempering. Care should be used not to hold the instrument too high in the flame or it will become "smoked," thus obscuring the redness in hardening and the coloring in tempering.

Hardening Excavators, Pluggers, Etc.—Having turned the gas on full, the hardening can be proceeded with in the following manner: 1st. Hold the instrument obliquely across but horizontally in the flame. 2nd. Heat to a bright cherry red to quite one inch back from the point (this may vary, however, according to its proportions). 3rd. See that the extremity is the last portion heated, taking particular care that it is not "overheated," in which case that portion of steel is hopelessly spoilt. 4th. When the heat is uniform immerse *immediately* in the oil.

The instrument is then hard and may be prepared for tempering as follows: Carefully wipe off all water, oil or scale with a dry cloth, then with a piece of emery paper of medium grit brighten the back or one of the sides (as convenient) of the instrument; care should be exercised in keeping this surface perfectly clean, as contact with the hand or grease will prevent the colors clearly showing. These will appear in the following succession: Pale straw, straw, dark straw, brown, purple, dark blue, blue, pale blue, and (finally) gray, at which, however, the metal is practically soft again, as the next stage is a dull red heat; the space of time before the pale straw is observed will depend entirely upon the thickness of the instrument, the fine ones requiring the greatest care on account of the rapidity with which the change takes place; the succeeding colors follow one another even more rapidly.

Tempering.—1st. Hold the instrument obliquely in the flame as in hardening, but rather more at right angles to it, and in such a manner that the run of color on the brightened surface can be distinctly seen. 2nd. Let the heat run down or travel from the back to the point, always taking care that the point is kept from contact with the flame. 3rd. When the desired color is observed quench *immediately* in water. This cannot be done too quickly, and in the case of fine instruments, both in hardening and tempering, the pots of oil and water may be held in the left hand close up to the gas burner, thus insuring quicker quenching. All excavators, plastic instruments and pluggers, etc., may be hardened and tempered in the manner given.

Ordinary excavators may be blued to within about one-eighth to one-sixteenth of an inch of the cutting edge, which can be left a brown or a dark straw if the operator prefers a rather hard instrument. If the cutting edge is blued it will be tougher, but will require "setting" more frequently. Plastic instruments and spatulas, and all those requiring an amount of spring, should be made a pale blue. Pluggers may be left a very dark brown or purple at the extremity, the remainder being blued. Ordinary drills may be left dark straw and burs light straw at their cutting edges, the remainder blue.

In hardening very fine instruments or probes it is advisable to adopt the following method: Fill an ordinary crucible with lead and heat it in a fire or furnace to a bright red, then take the instruments, and after smearing them over (about one to one and one-half inches from the point) with soft soap, dip them into the red-hot lead, they will then be quickly heated to the same temperature; at once remove and quickly quench in oil, by this means overheating the steel is effectually avoided, and also four or five may be hardened at the same time; the soft soap not only prevents the steel from "scaling" but keeps the lead from adhering to the surface. All dross should be removed before dipping. The tempering may be done as previously described.

Tempering Springs, Etc., by Flaring or Blazing Off.—In the case of clamps, spiral springs, etc., they may be hardened and tempered by the process of "blazing" or "flaring off." This is done as follows: Take a piece of ordinary binding wire and wind it loosely round and about the article to be hardened; the two free ends of the wire should be left about three or four inches long, so that when twisted together they will form a ready means of holding the article; this should be held in the flame until it is a uniform bright cherry red, then quench immediately in oil. Quickly removing it, hold it above the flame until the temperature is raised to the point of ignition of the oil clinging to it, then remove from the flame, and after the oil has burned itself out quench immediately. The instrument is then spring-tempered. It will be seen that the binding wire accomplishes a double purpose—the article can be enveloped in the flame, and more oil surrounds it because some is retained in the spaces between the twists of the wire.

Elevators may be hardened and tempered in a manner similar to

the smaller instruments previously mentioned, and the same applies to forceps; these, however, may also be "flared off," as a spring temper is required on account of the strain put upon them; this can be obtained by either method (forceps without cutting blades are of course exceptions to this rule). As a greater amount of heat is required for forceps on account of their size, either a gas blast or a fire (which is better) must be used in hardening them.

Enamel chisels may be hardened in mercury instead of oil or water, proceeding in exactly the same manner as the other instruments; in tempering, if the chisels are properly proportioned, and especially if of a stout pattern, they may be left practically colorless an eighth of an inch back from the cutting edge; it should then graduate quickly to a blue which should extend at least one inch towards the handle. After hardening and tempering enamel chisels as mentioned, the writer has found that the surface of ordinary sheet glass can be readily scratched with them; in this simple manner the reader also may easily test the results of his own hardening and tempering.

The above directions, if carefully followed, should give good results, provided the steel is of good quality and the instrument well forged and properly proportioned.—*Dental Record, Feb., 1899.*

IODIN AND PERMANGANATE OF POTASSIUM STAINS.—Answering the inquiry for colorless iodin, I would give the following: Add a saturated solution of hyposulphite of soda to tincture of iodin slowly, and stir till the color disappears. No doubt in decolorizing in any manner there is a new chemical composition, but whether this affects the action of the original tincture or not is a question. To remove stains of tincture of iodin from clothing, skin, etc., the hyposulphite of course acts beautifully. For removing the stains of permanganate of potassium from the hands or clothing, peroxid of hydrogen acts like magic.—*Bret Black, M.D., in Medical World.*

RIGHT-HANDEDNESS.—Kellogg believes that the child is born using both hands, arms, and legs equally well. Right-handedness is the result of careful training on the part of nurse and parent. Left-handedness is probably started by a burn, strain, or injury of the right hand during the critical period of babyhood. The great advantage of ambidexterity is dwelt upon, and Alexander Mott, Joseph Pancoast, Samuel F. B. Morse, Leonardo da Vinci, and Michael Angelo are mentioned among the other notable ambidexters. The crossed fibers to either brain are believed to be a switching-off apparatus, intended for only temporary use, and all arguments based on anatomy as forcing right-sidedness are thought to be weak.—*Massachusetts Medical Journal, Oct 1898.*

Letters.

LETTER FROM THE SOUTH.

Dear Digest: ATLANTA, March 21, 1899.

Dr. Williams' reply to his critics is a masterly effort, and is destined to go down to posterity as a classic of its kind. The fact is, his reply is unanswerable, but this unsurmountable barrier will in nowise deter the little fellows from making the attempt, for if there is one distinguishing difference of the average dentist, one which stands out in bold, not to say brazen, relief, it is his monumental assurance.

In the opinion of this provincial scribe, no contribution of recent years is so timely. It is modest, dignified, and yet keenly dissective, literally leaving no tenable ground for his would-be critics to stand upon. The profession at large has long been sadly in need of such a rebuke. The Sir Oracles and Encyclopedias of Miscellaneous Ignorance were becoming entirely too numerous and nauseating, not to say toxic, in ever and anon denying anything that was not in harmony with their preconceived views.

Dr. Williams states a tremendous truth when he declares that scientific research has had but little encouragement from sources whence it might be expected. And as for the earnest worker in nature's laboratory, he does not begin to command the respect and consideration that is lavished upon the man who designs a unique and quick method of mounting gold crowns.

This spirit of intolerance and dogmatism has been a serious hindrance to the crystallization of the basic principles in dentistry. After long years of patient, intelligent research we are given the results, and they are immediately rejected and renounced as inaccurate, not only by those whose views are entitled to some little weight, but by a whole regiment of men whose ignorance is exceeded only by their assurance.

The practice of medicine is founded upon certain well recognized basic principles. What a humiliating spectacle therefore to see dentistry dogging the heels of medicine, clamoring for recognition as a specialty, when we can boast of scarcely one basic principle or rule of practice. Beyond the realm of dental prosthetics there is

no one system of practice upon which all are agreed. Every man is a law unto himself, and "every man for himself and the devil take the hindmost," kind of a shibboleth.

It is high time that some of us retire from public gaze, at least until we can march boldly up to the altar of science with our contribution in one hand and the proof in the other. Stop saying "I deny this" and "I deny that," for we are making exhibitions of ourselves. Read and digest Dr. Williams' article, and it will save future embarrassment in many ways.

The distinguished doctor is worthy of a better Boswell, and he is hereby tendered the sincere apologies of JUNIUS, JR.

NEW YORK LETTER.

To the Editor of the Digest, NEW YORK, March 25, 1899.

MR. EDITOR: — A good move was made when the Dwinelle clinics were established by the Odontological Society. There is a monthly interest manifested in them, and we suggest that they be kept in mind by those who visit New York. It is a good place to meet those one has often heard of but never seen. Strangers may be sure of a cordial reception, and they will see interesting and up-to-date clinics. The afternoon clinics are always followed by the regular meeting in the evening, and at that gathering a large number of New York's active practitioners will be found. There is a cabinet collection in the society rooms which will well repay a visit.

This is an age of strange developments. We lately visited a newly fitted office. The waiting-room is done in Louis XIV style, but the operating-room is fitted up with a tile floor and a table absolutely antiseptic in all its appointments. This is a healthy sign of the fertility of some of our coming practitioners and a relief from so much of the lower ideals which lower the fair name of our profession.

A new patient called recently for service, and our attention was directed to an injury of both the upper and lower front teeth, causing a fracture on the cutting edge of one tooth above and two below. It occurred at the age of sixteen and the patient is now fifty-two. We suggested that improvement could be made by grinding, and were permitted to carry out our idea on the lower, and after seeing the good results there attained we treated the upper teeth in the

same manner. It is marvelous what can be done by judicious grinding.

During last summer we had an extreme experience with a patient nearly sixty years old in moving teeth, and a decided change of an unsightly irregularity dating from childhood was effected. We feared that drastic treatment at such an age had endangered the pulp of one firm tooth, but it seems to be all right. Dentistry means far more than simply pushing gold into a hole.

There is one feature of Dr. M. C. Smith's article in the last DIGEST which we feel disposed to emphasize, namely, the polishing of teeth. After hearing the paper read, we said that if the profession did not know the value of this practice they had much to learn. We wrote an article in 1867 on this procedure, and have been putting it in practice ever since. In many cases there is a decided opposition, arising from an unintelligent prejudice against removing the enamel. The question should receive further consideration.

We have had a call from Dr. Stewart of Greenville, Miss., who claims to have hit upon a new idea in connection with Riggs' disease, vs. pyorrhea alveolaris, vs. idiopathic alveolitis. He gave a clinic and read a paper this month, which we shall describe later.

One thing will surely be the outcome of all this discussion—an intelligent demand for a more radical treatment of the disorder. We stand fearlessly against all advocacy of so much "sugar-water" treatment, and the feeling that we must be very careful not to wound the surrounding tissues of the teeth. It is a mischievous heresy, which our experience with this disease since 1874 has proven. Dr. Riggs' treatment was radical and that gave him success. The tissues need a decided stirring-up, and by an operator who believes in what he is doing. Ninety-nine out of every hundred of those who claim to treat this disorder have no confidence in what they do, and this certainly accounts for the small percentage of success. From a large and varied experience we firmly believe that the radical stirring up of the tissues lessens the need of medication.

Some time ago we announced that the venerable Dr. Rich was about to start a new business venture in New York, and a few days ago we met him on Fifth avenue and he stated that he had started a school of physical culture. He taught it over sixty years ago, and doubtless his longevity is a result. His eighty-eighth

birthday was this month, but he does not look his years. He has been in active practice fully sixty years, and is one of the best of the old school. We should say that he is very strong in discussion even now.

The March meeting of the First District Society was unusually interesting. Dr. Baxter, president of the state society, read a praiseworthy oration, and Dr. Crawford of the sunny south would find a rival in him. He recommended a state code of ethics which should hold all practitioners responsible for unprofessional proceedings subject to a suspension from the privilege of practice or forfeiture of diploma. We do not think such legislation could be sustained.

Dr. W. Irving Thayer read a paper upon the destructive effect of catephoresis on dental pulp. The society did not feel satisfied with the paper, but the resolution not to publish it was finally laid on the table. We think the facts, if they are facts, should not be kept out of sight merely because there was some personal prejudice against Dr. Thayer.

Theodore A. Wadsworth, fifty-six years old, a well known dentist of this city, died suddenly from angina pectoris March 18. He was a nephew of the late Dr. Wadsworth of Washington, a member of the First District Society, and a very competent practitioner. We will here emphasize a very prevalent and great lack of fraternal regard toward those of our immediate acquaintance, for we do not attend their funeral services. This was very apparent in Dr. Wadsworth's case, for notwithstanding that full notice was given by the press, and that the funeral was in the evening when all are at leisure, and in a neighborhood of two hundred dentists who knew the deceased, only three dentists besides ourselves were present. We think this shows great thoughtlessness.

Dr. Stewart made a very favorable impression before the Odontological Society, both with his clinic and paper, the latter being entitled "Partial Removal and Decalcification of the Cementum in the Treatment of Pyorrhea Alveolaris." His practice and ideas seem to us to confirm the original Riggs treatment by an exaggerated procedure, excepting the use of acids, for Dr. Riggs used no acid or medicine in the pockets, depending almost entirely upon mechanical treatment with instruments. Dr. Stewart's practice is also most radical, for he sets to work not only to remove calcific

deposit, but the calcified cementum, getting back to the original living structure, and by excessive inflammation he gets both hard and soft secondary tissue. And further, by making longitudinal grooves with excavator and bur, which are filled in by the secondary living tissue, he thus secures a mechanical support which assists in the firmness of the tooth.

That he obtains good results is true without a doubt, and while we think his methods may seem unnecessarily severe on the patient, yet by the use of local obtundents and general anesthetizing we are sure all this objection can be met. After all is said, however, there will be but a very small percentage of practitioners that will ever have the ability and surgical skill necessary to success. Cordially, NEW YORK.

TRIFACIAL NEURALGIA AND MIGRAINE.—Apply locally a tampon moistened with the following: Sulph. ether 50 gm., melissa alcohol 50 gm., menthol 20 gm. The pain vanishes with the refrigerating effect produced, and relief is experienced for hours.—*Gaz. Med. de Liege.*

SYMPTOM ANTICIPATING THE EFFECT OF CHLOROFORM ANESTHESIA.—Dr. Lehman (*Allg. med. Central Zeitung, 86, 1898*) says that by means of his sign one can tell at the beginning of narcosis whether the anesthesia will be an easy or a difficult one. In patients in whom the anesthesia will be difficult the eyelids remain open or half open from the beginning; if the lids are closed by the anesthetizer they at once reopen entirely or to half that extent. On the other hand, those patients who stand the chloroform well—in other words, those in whom anesthesia is easy—will keep their eyes closed from the very beginning. Without attempting to enter into any explanation of this sign, Lehmann is so convinced of its value and efficacy, that in the presence of open eyelids during the beginning of chloroform anesthesia, he at once prepares any necessary instruments before proceeding to the operation.

INFLAMMATORY TUMORS OF THE SUBMAXILLARY SALIVARY GLANDS.—Kuettner, of Tubingen (*Archiv fur Klin Chirurgie, Bd. 57, Heft 4*) has observed only five cases with these tumors. He says the tumor resembles that reported by Riedel as a chronic inflammation of the head of the pancreas. The tumor, situated in the submaxillary glands, is hard, slightly movable, and the size of a hen's egg or an apple, with the appearance of a true malignant tumor. At first it is sensitive to pressure, but later becomes painless. Swallowing is difficult and sometimes the speech is impaired. The extirpation of the tumor is not always easy. Microscopically there is an increase of connective tissue and a large amount of small-cell infiltration without the slightest sign of malignant degeneration. Etiologically it must be attributed to an inflammatory process in the oral cavity. There seems to be no retrogressive metamorphosis, but rather a propensity on the part of the tumor to further extension.

The Dental Digest.

PUBLISHED THE TWENTY-EIGHTH DAY OF EVERY MONTH
At 2231 Prairie Avenue, Chicago,
Where All Communications Should be Addressed.

Editorial.

THE EMPIRICAL OR THE SCIENTIFIC METHOD.

We publish in this issue a paper from the able pen of Dr. J. Leon Williams of London, which is reprinted in full because we regard it as the most important article which has been written for some time. Dr. Williams has given a very truthful and graphic description of the dental profession and some of its problems, and while we agree with most of his propositions, we do not think he has gone fully enough into the causes which have brought about the various conditions, especially the unscientific attitude and habit of thought of the great majority of dentists. He deplores this state of affairs, but it will always be so until a larger per cent of those entering the profession are men with trained minds. In addition to this, the poverty of the average dentist is an unsurmountable barrier to progress. We wish Dr. Williams had offered some remedy for this same poverty, which is the greatest stumbling-block to scientific work and advancement of any sort in the path of the dental profession to-day.

His definitions of science and its value can not be too highly commended and we urge all our readers to thoroughly assimilate this part of his paper. While his illustration of the farmer's crows is not very complimentary, we fear that the application of it to the profession is only too just, and his sharp criticism of "the man of common sense" and "the person of authority" can not be refuted. Too many men take the stand that "we can not go over all that ground and prove our points, but we can have our theories and believe them." The reference to the unscientific nature of dental society discussions is timely, as most such are utterly irrelevant to the topic in hand. We take the ground that no one should discuss a subject unless he is thoroughly familiar with it, as otherwise he merely wastes the time of the meeting and makes a spectacle of himself.

It is not necessary to dwell long upon Dr. Williams' first spe-

cific topic, as the theory advanced by Miller, Black and himself, relative to the cause of dental caries, has been well proven by the original researches of these gentlemen, and probably nine-tenths of the dental profession who think about the subject at all believe to-day that caries is a germ product. One proof of this belief is the great number of mouth-washes used by the community and ordered for them by dentists, but as the writer says, very few practitioners understand what they are prescribing or know how long a wash must remain in the mouth to be effective.

The statement that our dental societies are not scientific is very true, but the fault is not due to the plan of organization, but to the fact that there are too few men in them who are capable or willing to do such work. This is illustrated by the history of the American Dental Association, for this organization placed a fund at the disposal of the sections for scientific work, yet little of it was used. This brings us back to our former proposition, that the dental profession as it is to-day cannot be very scientific in character.

Dr. Williams does not understand the financial condition and attitude of the profession, or he would never formulate such a scheme as he proposes:—"Now suppose a committee or a department were to be created in the National Dental Association, to be known as the Bureau of Original Research Work and Records, or by some such name, with sub-organizations in every state, which should report to the central organization six weeks in advance o each annual meeting; and suppose there were a thousand dentists in the United States who had sufficient interest in the progress and the general position before the world of our profession to contribute five dollars each to a fund for this organization, and another thousand who would give two dollars and fifty cents each, and five thousand more who would give one dollar each."

We have had considerable experience in organizing and inducing dentists to contribute when their own financial interests were vitally at stake, and it took several years of constant urging before even thirty-five hundred were persuaded to contribute only $10 each for their own safety. And in this case five-sixths did not contribute anything for the benefit of an organization which has saved every dentist from $100 to $500 annually for the past ten years. Does Dr. Williams think he could arouse a deeper interest in the cause of science?

The Dental Protective Association has shown two things. First, how hard it is to induce the average dentist to contribute towards or cooperate with any sort of organization; and second, what great results can be brought about by united effort. This latter gives weight to Dr. Williams' plea for more harmonious action, and since this is the strongest point in his whole paper, we commend it to the careful consideration of our readers. The dental profession is unique in its lack of *esprit de corps;* other professions are banded together, and even the most menial class of mechanics and artisans have their unions, clubs, etc., and what is more important, support them loyally.

We would touch upon the question of patents, for Dr. Williams is in error as regards the code of ethics forbidding dentists to take out same, as we know of no rule which prohibits an inventor protecting his achievement. There are, however, a very few men in our profession who criticise such a course and believe a dentist should never take out a patent. We feel justified in presuming that these men have always adopted such selfish ideas, and have never labored very hard for their profession. The stand they take seems like an easy way to be considered highly ethical.

Finally, we must differ radically from Dr. Williams' defense of the manufacturing companies, as they have been and still are the greatest menace to the independence of the profession. The fact that the trusts are enormously rich and the dentists are pitiably poor shows which one derives the most benefit from the other. While we would not accuse him of taking the position that "we cannot go over all that ground and prove our points, but we can have our theories and believe them," the very fact that he utterly ignores any mention of the Protective Association, which is the largest dental association in the world, and which has done more to band the profession together than any other, leads us to believe that his judgment has been biased and his eyes closed to existing evils by some of these same supply companies.

SALUBROL IN DENTISTRY.—F. Berger states that salubrol (dimethylen-antipyrin bromid) is preferable for dental work as an antiseptic to even a one per mille solution of sublimate, since its action is more prompt. It is moreover a good hemostatic, but is perfectly free from action on the mucous membrane. It is specially useful in treating cavities after extraction.—*Therap. Woch., iv. 1094.*

Notices.

ELGIN DENTAL ASSOCIATION.

This organization was recently formed with the following officers: President, W. J. Phillips; Vice-President, G. A. Goodrich; Secretary and Treasurer, O. A. Chappell.

SOUTHWESTERN MICHIGAN DENTAL SOCIETY.

The annual meeting of the Southwestern Michigan Dental Society will be held in Cassopolis, April 11 and 12, 1899. An interesting meeting is promised.

C. E. BURCHFIELD, Sec'y, St. Joe.

IOWA STATE DENTAL SOCIETY.

The next annual meeting of the Iowa State Dental Society will be held at Des Moines May 2-5, 1899, and a cordial invitation is extended to the profession to be present.

W. G. CLARK, Sec'y, Cedar Rapids.

SOUTHERN WISCONSIN DENTAL ASSOCIATION.

The thirty-fifth annual meeting of the Southern Wisconsin Dental Association will be held at Janesville, May 3 and 4, 1899, and the profession in this and neighboring states are invited to participate.

J. H. REED, Sec'y, Lancaster, Wis.

KANSAS STATE DENTAL ASSOCIATION.

The twenty-eighth annual meeting of the Kansas State Dental Association will be held in Topeka, May 2–4, 1899. An interesting and profitable program will be presented. Reduced rates have been secured on the railroads of the state, and all members of the profession are cordially invited to attend.

EDWARD BUMGARDNER, Sec'y.

ILLINOIS STATE DENTAL SOCIETY.

The thirty-fifth annual meeting of the Illinois State Dental Society will be held in Chicago, May 9-12, 1899. An excellent program is being prepared, which with all particulars will be printed in the April issue of this journal. A large attendance is expected, and all dentists who can conveniently do so are cordially invited to be present. A. H. PECK, Sec'y, 92 State St., Chicago.

ODONTOLOGICAL SOCIETY OF WESTERN PENNSYLVANIA.

At the annual meeting of this organization, held at Pittsburg, March 15 and 16, 1899, the following officers were elected: President, O. L. Hertig; Vice-President, J. F. Thompson; Secretary, W. E. Jackson; Treasurer, J. A. Libbey; re-elected; Board of Censors, H. J. Horner, L. C. Hobbeger, C. W. Bard; Executive Committee, M. S. Burns, C. C. Taggart. The next meeting will be held at Butler, Pa., in June.

NEW ENGLAND ASSOCIATION OF DENTAL EXAMINERS.

At the third annual meeting of this organization, held in Boston, Feb. 16, 1899, the following officers were elected for the ensuing year: President, D. F. Keefe, Rhode Island; Vice-President, G. F. Cheeney, Vermont; Recorder, George R. Parmele, Connecticut. Two New England states have already had their dental laws amended so as to be identical with that of Massachusetts, and the association hopes to perfect a standard of uniform requirements and interchange of certificates among the various states.

DENTAL ASSOCIATION OF NEW SOUTH WALES.

The fifth annual meeting of this organization was held in Sydney, Jan. 31, 1899, and was well attended. The president's report dealt, among other things, with the present position of the dental bill and the untiring work of the council in its struggle to get same passed; the prospects for this are good. The following were elected for the ensuing year: President, A. Burne; Vice-Presidents, H. Patterson and S. Chaim; Treasurer, O. Davis; Committee, C. C. Marshall, H. S. Newton, E. A. Gabriel and J. S. Darton; Auditors, B. Corbett and C. Chandler; Secretary, H. Taylor.

VERMONT STATE DENTAL SOCIETY,

At the annual meeting of the Vermont State Dental Society, held at Burlington Vt,. March 15 to 17, 1899, the following officers were elected: President, K. L. Cleaves; First Vice-President, Henry Turrill; Second Vice-President, C. W. Steele; Recording Secretary, Thos. Mound; Corresponding Secretary, Grace L. Bosworth; Treasurer, W. H. Munsell; State Prosecutor, G. W. Hoffman; Executive Committee, J. E. Taggart, J. A. Pearson, J. H. Jackson. H. W. Northrop of New York, A. J. Sawyer of Manchester, N. H., and F. B. Smith of Stowe, Vt., were made honorary members. The next meeting will be held at St. Johnsbury, Vt., the third Wednesday of March, 1900. The papers read at the recent meeting will be published in the DIGEST.

THOS. MOUND, Sec'y.

LATEST DENTAL PATENTS.

32,491. Trade-mark—Medicinal antipurulent, Battle & Co., Chemists' Corporation, St. Louis.

32,529. Trade-mark—Dental gold. S. S. White Dental Manufacturing Compony, Philadelphia.

619,272. Head-rest, Arthur W. Browne, New York, N. Y., assignor to S. S. White Dental Manufacturing Company, Philadelphia.

619,832. Automatic dental plugger, Hugh McLaren, Toronto, Canada, assignor to J. W. Ivory, Philadelphia, Pa.

619,847. Apparatus for casting split dies for artificial tooth-crowns, John H. Slinkman, assignor of one-half to C. O. Spillman, Martinsburg, W. Va.

619,928. Dental cabinet, Chauncey S. Bigelow, assignor to Ransom & Randolph Company, Toledo, Ohio.

620,303. Dental flask, Ferdinand Groshans, Baltimore, Md.
620,434. Case for hypodermic syringes, George Ermold, New York, N. Y.

NEW YORK COLLEGE ALUMNI ASSOCIATION.

At the annual meeting of this organization, held March 8, 1899, the following questions were offered for discussion and aroused much interest: 1. What should be the relationship between a specialist in crown and bridge work and a patient sent to him for treatment in that particular branch, the patient having been sent by a brother practitioner? 2. Would said specialist be justified in doing any new work whatsoever for said patient at that or any future time without consulting the brother dentist?

REPORT OF DR. FRANK A. ROY.—1. When a specialist accepts a patient from another practitioner for treatment in his specialty he is in honor bound to perform only the specified operations. 2. And he should refuse to give any other treatment except with the knowledge and consent of the brother practitioner. 3. The specialist should not by any inquiries or hints attempt to destroy the patient's confidence in the family dentist. 4. And having finished the specified operations, if the specialist find any other treatment necessary, the patient should be referred back and the family dentist notified. 5. And at no future time should the specialist accept said patient without the knowledge and consent of the brother practitioner.

REPORT OF DR. JOHN I. HART.—It is my opinion that the specialist should perform only such operations as are indicated by the general practitioner; and, further, that the specialist should not by sign, hint, innuendo, or suggestion, attempt to destroy the confidence that the patient reposes in the general practitioner, and should the patient request the specialist to do any other work than that indicated by the general practitioner, the specialist should not attempt same without the knowledge and consent of the general practitioner; besides, if the specialist finds any work which is in poor order in the patient's mouth, it is his duty to inform the general practitioner of that fact. Once the operation that the patient is referred for is performed, and the patient sent back to the general practitioner, I think that while it would be in bad taste for the specialist to accept said patient after a lapse of time, without notifying his brother practitioner, the general practitioner has no redress.

Obituary.

DR. HENRY HOWARD KEITH.

Henry Howard Keith, D.D.S., was born at Salem, Mass., June 14, 1847. He resided in Boston until the beginning of the Civil War, when the family moved to Chicago. After working a short time in a machine shop to learn the use of tools he was apprenticed to his uncle, Mr. A., of New York, who was a jeweler. In 1864 Dr. Keith went to Philadelphia and entered the laboratory of Dr. Charles Essig. He made such rapid progress that when Dr. Essig moved to Baltimore in 1868 he took Dr. Keith with him, and while

there he met the lady who afterwards became his wife. After spending about two years in Baltimore he went to Newark, N. J., where he worked for Drs. DaCamare and Pinney until he was married, in January, 1871.

He came to St. Louis in February, 1871, and in the fall of the year opened a laboratory. He was successively with Drs. Morrison, Eames, Park, McKellops and Lange. He attended the Missouri Dental College and graduated in 1873, while with Dr Park, and afterwards held positions in the same college in 1875-6 as demonstrator of mechanical dentistry, and as professor of same from 1876 to 1879 inclusive.

Dr. Keith's talents lay in the direction of plate work, in which he had no superior, though he had a large practice in operative work. His heart was in his profession and he spared neither time nor pains when engaged in a difficult piece of work; and the greater the difficulties the more he enjoyed overcoming them—in which he seldom failed. As an operator he was equally skilled, and was extremely gentle and considerate of his patients.

His chief characteristic seemed to be a desire to help the younger members of the profession. Every one coming to St. Louis met with a pleasant welcome from him, and he always did what he could to advance them. His knowledge was given freely and heartily, and he was ever eager to help or instruct others.

At Lake Minnetonka in 1888 he contracted the liver trouble that finally caused his death. Returning from a summer vacation in September, 1898, he resumed practice, though far from well. His health failed very fast, and he died January 26, 1899, from peritonitis. He was cremated as he had desired, and his ashes will be buried at Asheville, N. C.

As an instructor Dr. Keith was one of the few men who seemed capable of imparting his knowledge so that the pupil could not fail to grasp the ideas of the master mind. He was a member of a sketch club and well versed in photography, and for that reason was an adept in illustrating his subject. His office was a study in itself for neatness, convenience and all that was new in modern dentistry, and his laboratory was equal to that of his office. He was considered one of the best continuous-gum workers in this country.

He was a man who was continually striving for the advancement of his profession. He was an active member of both the state and city society; served four years as recording secretary of the latter; and in 1882 was president, and no better drawing card could be announced than the mere statement that Dr. Keith would either read a paper or give a talk on some dental subject. As a professional man he was a model. He was never known to speak ill of any professional brother so as to advance himself in the estimation of his patients. His professional liberality was one of his many good traits that should be observed by us all. He was always willing to assist any dentist, both financially and professionally, and nothing gave him greater pleasure than to impart his practical knowledge to any brother needing his advice. He was a frequent contributor to the dental journals.

Committee of St. Louis Dental Society. { JOHN G. HARPER, WALTER M. BARTLETT, JOS. G. PFAFF.

News Summary.

W. B. KIDD, a young dentist of Louisville, died March 7.

ALBERT G. GOODMAN, a dentist of San Antonio, Tex., died Feb. 21.

ALFRED WELCH, aged 76 years, a dentist of Minneapolis, died March 15, 1899.

H. P. WAHL, a well-known dentist of New Orleans, died January 28, 1899, aged 42 years.

E. B. GREENLEE, a dentist of Cleveland, died March 8, of appendicitis, aged 31 years.

W. H. SHATTUCK died March 11. He had formerly conducted an office in Janesville, Wis.

P. J. O'CONNOR, thirty-three years old, a dentist of Pittsburg, died March 21, from pneumonia.

FAYETTE THOMPSON, a dentist of Waukegan, Ill., died March 24, 1899, of heart disease, at the age of 67 years.

UNIVERSITY OF SOUTHERN CALIFORNIA COLLEGE OF DENTISTRY has been commended by the California State Board.

S. J. KENNEDY, the New York dentist who is accused of murdering a girl last August, was put on trial March 22, 1899.

J. F. WAGNER, formerly of Tiffin, O., has been appointed postmaster at Skaguay, Alaska, where he is practicing dentistry.

TAX ON DENTISTS.—The dentists of Richmond, Oklahoma, have been paying an annual tax of $10, and it is now to be raised to $20.

WM. S. JEWETT, a dentist of Portland, Me., died February 1, 1899, aged 55 years. He was traveling for his health and succumbed at Norfolk, Va.

HAYDEN DENTAL SOCIETY.—The members of this organization and their wives were entertained March 20, 1899, at the home of Dr. M. B. Rimes.

ALBION W. DUDLEY, a dentist of Salem, Mass., died March 7. He served with distinction throughout the civil war, and held offices in various dental societies.

MINNEAPOLIS DENTISTS AROUSED.—The dentists of that city are dissatisfied with the workings of the state dental board, and allege that it is not properly fulfilling its duties.

WM. BLANC, the oldest dentist of Camden, N. J., died January 29, 1899, from abscess of the brain. He served with distinction throughout the civil war and attained the rank of captain.

HIGHER COURT WILL DECIDE.—One of the dentists in Michigan who was arrested for practicing dentistry without a license was found guilty in the circuit court, and will now take it to the supreme court.

MILWAUKEE MEDICAL COLLEGE ALUMNI ASSOCIATION elected the following officers March 14th: President, W. C. Zochert; Vice-President, J. E. Purtell; Secretary, E. P. Taughn; Treasurer, G. H. Carter.

MISSOURI STATE BOARD UPHELD.—The circuit court March 11, 1899, upheld the State Board of Dental Examiners in its refusal to issue certificates to dentists who hold diplomas from unauthorized or illegal dental colleges.

JACKSON DENTAL SOCIETY was organized at Jackson, Mich., March 15, 1899, and the following officers were installed: President, George H. Mosher; Vice-President, W. E. Merritt; Secretary, F. W. Howlett; Treasurer, G. E. Holcomb.

OHIO COLLEGE ALUMNI ASSOCIATION.—The next meeting of this organization will be held April 12, 1899, and there will then be unveiled a marble tablet to the memory of Dr. George Watt, an alumnus and former teacher of the college, and a man well known during his lifetime as a dentist, editor and investigator.

INDIANA AND THE INDEPENDENT MEDICAL COLLEGE.—When the State Board of Indiana was about to arrest an unlicensed dentist he sent to Chicago and got a diploma from the Independent Medical College, with which he defied the board. The state board will now ask the courts to test the standing of this institution.

BRIDGE GIVES CLUE.—A sneak-thief stole a bridge which belonged to a dentist in Independence, Mo., and was arrested some days later in Kansas City while offering it and some scrap gold for sale. The police then began a search for the owner of the bridge, and when the dentist identified it as his own there was a clear case against the thief.

ILLINOIS "COLLEGE-TRUST" BILL DISLIKED.—This bill, which is intended as a blow against the diploma mills of Illinois, provides that no college shall be legalized which has not $100,000 endowment. This would work great wrong and injury to many small but deserving colleges of the state, and they are consequently fighting the measure.

POWER OF THE TRUST.—A dealer who has been advertising in the DIGEST for several months writes as follows: "I am very sorry to have to stop my ad., as I consider your journal a very valuable medium, but 'the powers that be' say that I must not advertise with you." Yet we are told that there is no dental trust, and that it never boycotts anyone outside its charmed circle.

MRS. JEAN BROPHY, wife of Dr. Truman W. Brophy, dean of the Chicago College of Dental Surgery, died February 6, 1899. The funeral was attended by the entire student body of the college, as well as the faculty, friends and relatives. The interment was at Rose Hill Cemetery, and the following dentists officiated as pall-bearers: C. N. Johnson, A. W. Harlan, J. G. Reid, W. L. Copeland, Garrett Newkirk, C. H. Besley.

HIGH STANDARD FOR DENTISTS.—The Association of German Dentists passed resolutions at its recent annual meeting at Eisenach, urging the authorities to require higher educational attainments of students of dentistry, and a longer course in the university, raising the standard from certificate of first grade in "gymnasium," as at present, to the diploma of a "gymnasium" or "real gymnasium" (high school).—*Munich Med. Woch., Aug. 23.*

AFTER KANSAS CITY INSTITUTIONS.—Senator Stocks introduced two bills Feb. 14, 1899, to revoke the charters of the Kansas City Dental College and the Kansas City Dental College Association. The concerns operate in Kansas City, Mo., but are chartered under the Kansas law. It is said they have neither faculty, course of study nor students, but sell diplomas at $30 each. The Kansas State Board of Dental Examiners is urging passage of the bills.

FALSE TEETH USED BY THE ROMANS.—The fact that false teeth set in gold were in use among the Romans at an early period is established by the Eleventh of the Laws of the Twelve Tables. The Tenth Law restrains useless expenses at funerals in general, but the Eleventh, as an exception, allows that the "gold settings of false teeth, or the gold with which they are bound, should be buried or burnt with the deceased."

INDIANA'S NEW LAW makes it unlawful for any one to practice dentistry in the state without a license, and provides for a heavy fine in case of violation. Licenses shall be issued to those who pass a satisfactory examination and to persons holding diplomas from reputable dental colleges or holding licenses from the old board. Licenses may be refused to criminals, inebriates, persons of bad character or unsound mind. Licensed physicians and surgeons may extract teeth in performance of their usual duties.

MISSOURI'S NEW BILL.—This will be given to the legislature soon, and provides that the secretary of state shall not issue charters to persons, associations or corporations for the purpose of conferring degrees in the science of medicine, pharmacy or dentistry, unless the application be approved by the state board of health, the state board of pharmacy, or the state board of dental examiners respectively, and that the secretary of state is empowered to revoke charters which give authority to confer degrees, upon the recommendation of the three aforesaid bodies.

JUDGE BAKER DECIDES AGAINST INDEPENDENT MEDICAL COLLEGE.—The quo warranto proceedings to revoke the charter of this diploma mill were concluded February 15 before Judge Baker, in the circuit court in Chicago, and a judgment entered finding the defendant guilty as charged in the information. There was no argument made in the case, as the attorney for the college stated to the court that in his opinion under the ruling of the supreme court two years ago, when the charter of the Illinois Health University was revoked, the finding in the present case must necessarily be against the Independent Medical College.

DISTRICT OF COLUMBIA DENTAL BILL AMENDED.—The new bill is almost the same as the one described in the November, 1898, DIGEST, but it is very specific in prescribing limitations of the right of corporations to practice dentistry, requiring that every man practicing in connection with such corporations must display his dental license.

The most discussed proposition of the bill is the reciprocity clause, which provides that the board of dental examiners may license to practice dentistry in the district, without examination or after limited examination, any licentiate of another state, providing such state grants equal privileges to the licentiates of the district.

X-RAY BURNS CAUSE SUIT.—A woman in Philadelphia swallowed two false teeth. The hospital physicians looked for them with X-rays, and the woman now claims that she was badly burned, and has sued the hospital surgeons for malpractice.

TO ECONOMIZE LIFE.—Tesla, in the *Popular Science Monthly*, says: "A man has just so many hours to be awake, and the fewer of these he uses up each day the more days will they last. I believe that a man might live two hundred years if he would sleep most of the time. That is why negroes live to such an advanced age—because they sleep so much. The proper way to economize life is to sleep every moment that it is not necessary or desirable that you should be awake."

NERVOUS DISTURBANCES DEPENDENT ON ADENOID VEGETATIONS.—Declaire has made a study of the accidents to which in certain cases the presence of adenoid vegetations may give rise. He found present in many cases a cough, stridulous laryngitis in twenty-seven out of ninety cases, asthma, headache in six out of ninety cases, incontinence of urine, and a tendency to cry out at night when sleeping. Extirpation of the adenoid vegetations generally effected a cure of these complications and invariably restored the patient to general good health.

BACILLI IN THE THROAT.—Hand of Philadelphia recommends the solution of nitrate of silver in the strength of 60 grains to the ounce of water to rid the throat of bacilli after the disappearance of diphtheritic membrane. Often after the throat is entirely clear and the patient apparently well, examination shows that bacilli are still present. In such cases quarantine must still be observed. Hand reports very good results from this method, the bacilli usually disappearing within a very few days. The solution should not be used until the membrane has disappeared.—*Cleveland Jour. of Med.*

FREE DENTISTRY IN SCHOOLS.—Experiment undertaken by Wurzburg, Bavaria, City Council. The city council of Wurzburg, Bavaria, the seat of a university, has just taken action, which Commercial Agent Stern at Bamberg says is worthy of imitation in the United States. In accordance with this action, the teeth of the poor pupils of the public schools of Wurzburg are to be examined and cared for free of cost, provided the parents give their consent. The commercial agent says it is also intended to treat diseases of the ear and throat in a like manner, should the teeth experiment prove successful.

VULCANITE AND VULCANIZATION.—Black-looking caoutchouc owes its dark color before vulcanization to the admixture of lamp-black. White or gray caoutchouc often contains lead. Dental vulcanite has about the following composition: Caoutchouc, 10 parts; sulphur, 6 to 8; cinnabar, 12 to 16. The haste with which the temperature needful for vulcanization is usually attained is detrimental to the vulcanite, inasmuch as the proper amalgamation of the sulphur and caoutchouc is interfered with. Caoutchouc containing little sulphur takes longer time to vulcanize than caoutchouc which is rich in sulphur.—*Journ. f. Zahnheit. xiii., 2.*

SODIUM BICARBONATE FOR HICCOUGH.—A recent communication to the Paris Academie de Med. reports that hiccough has always been arrested, in the long experience of the writer, with 5 grams of sodium bicarbonate in half a glass of Vichy water taken at one draught. The hiccough disappears with the eructations.—*Bulletin, Oct. 31.*

EXACT METHOD FOR MEASURING RUBBER.—Take a tumbler and a piece of wood long enough to reach across the top. In one side of the wood drive a small wire nail, allowing the head to protrude about one-half inch. Remove wax from investment and roll into a ball. Insert point of an instrument in wax and place it in the tumbler. Lay wood across tumbler, with nail down. Pour water into glass until the surface touches head of nail. Remove wax from water and replace it with rubber until surface of water touches nail, and the exact quantity of rubber required will be in tumbler.—*Dr. W. H. Craig, Col., in Pacific Gazette.*

CONSERVATIVE TREATMENT OF WOUNDED HAND.—The main point is to cleanse the hand thoroughly, best accomplished with alcohol and ether, followed with copious irrigation with a stream of hot water at 50 to 55 degrees C., which has the threefold advantage of being hemostatic, aseptic and warming, thus counteracting the coldness that follows the traumatic shock. It may be necessary to use an anesthetic to make the cleansing as perfect as necessary. Once completed, the wound is dressed with iodoform, or simply sterile gauze, and left untouched for four days, with the hand and forearm immobilized. A wound thus treated heals without a trace of suppuration.—*Martin, Jour. des Pract. No. 30.*

SALICYLATE OF SODIUM IN TOOTHACHE.—Dr. Frederick C. Coley (*Journal of Medicine and Science*) believes salicylate of sodium to be the best remedy in toothache arising from catching cold. A dose of fifteen grains will usually relieve the pain promptly, and if repeated every four hours the inflammation may entirely subside, leaving the carious tooth to be disposed of according to circumstances. Fifteen grains of sodium salicylate, with fifteen minims of tincture of belladonna, will often procure refreshing sleep instead of a night of agony. Dr. Coley's first experience of it was on his own person, and since then he has used it with brilliant successes and few failures. It is especially valuable with children, where extraction of teeth is to be avoided.

ADMINISTRATION OF MEDICINE.—Professor Moritz has investigated the conditions necessary for the absorption of drugs, and finds that medicaments are absorbed most speedily when taken with plain water while fasting. Soup, milk, wine, etc., retard absorption, even when the medicine is taken fasting, but absorption is still more slow when the medicament is taken with liquid after food, and most slowly of all when taken after food in the absence of liquid. To secure the most speedy absorption of any drug, therefore, it should be administered with water on an empty stomach, and in many cases it will be found that a definite effect will thus be produced, though no effect would be perceptible if the same dose were administered shortly after food.

ARREST OF HEMORRHAGE.—Cavazzani (*Gazz degli Osped*, September 25, 1898) draws attention to a revival of an old method of arresting hemorrhage

reintroduced by Tuffier, who christened it "angiostripsia." The essence of the process consists in a violent crushing or bruising of the vessel by means of strong specially-made forceps, so that the intima is immediately broken. If no blood oozes after this there is no fear of its doing so later. The advantages claimed for the new method are safety, speed, avoidance of injury to tissues and freedom from the dangers which attend the use of the ligature. The author has seen the angiotribe used successfully in an excision of tongue where no ligature was applied. Indeed, he goes so far as to say the angiotribe has almost suppressed the use of the ligature.

AGE OF PARENTS, AND ITS INFLUENCE ON THEIR PROGENY.—As the result of a careful investigation of twenty-four thousand cases, Dr. Jarosie presented to the director of the Hungarian bureau of statistics the following conclusions: The offspring of parents between the ages of twenty and twenty-five are likely to be weak and delicate, but between twenty-five and forty-five will probably be strong and thrive. The mother bears most robust children between her twenty-fifth and thirty-fifth year. When the mother is ten years younger than the father, the proportion of healthy children is greatest, the chances being ten per cent more favorable than when the parents are of about the same age.—*Medical Record.*

SIGN OF GRAVE FACIAL PARALYSIS.—Drs. Bordier and Frenkel (*Le Scalpel*, June 19) have noted a new phenomenon in peripheral facial paralysis, which has considerable prognostic value. This is the rotation of the ocular globe from above downward during the act of closing the eyelids. Bonnier says he has encountered this sign in all cases that he has observed. Frenkel and Bordier explain it as an actual nervous discharge; voluntary excitation, having no action on the facial, discharges itself in another way. Dr. Bonnier thinks that it is a simple derangement in moticity. Campos thinks that it is a physiological phenomenon becoming more manifest by the fact of a more considerable nervous impulse, and that the phenomenon is more manifest according as the impulse is more intense—that is to say, as the paralysis is more marked.

MEDICINE DEFINED.—In confirming the decree of the lower court giving the Medico-Chirurgical College the right to confer degrees in dental surgery, the supreme court makes the following remarks: "We take the word 'medicine' in its common signification, which in the beginning, and yet, with most of us includes all learning having for its object the care of the health and the cure of the ills of the human body. Even within the recollection of some of us the practicing physician or family doctor kept in his own office his drugs, compounded them himself, and not seldom maintained a dental chair, wherein he seated his patients and dosed or extracted their ailing teeth. He had not only been taught dental surgery and pharmacy, but practiced both under his degree from a college of medicine. A college of dental surgery may be restricted to granting a degree only, in that particular branch of the profession; the narrower would not include the broader field of learning surrounding it; but if, as is not disputed, the Medico-Chirurgical College has full authority to teach all branches of medicine, including dental

surgery and pharmacy, by necessary implication under the Act of 1867 it has the power to certify by diploma or degree the proficiency and qualification of the student in that particular branch of the main subject.

"The petition does not ask that any new power be conferred by the court; it only prays for an amendment declaratory of its existing authority under the Act of 1867. It had unquestioned authority to impart instruction in dental surgery and pharmacy; its authority to say it had imparted it and the student had absorbed it might be questioned, because such authority was only necessarily implied and not expressly given; the prayer and the decree of the court below went no further than in relief of the uncertainty; not uncertainty of lawyers or courts, but of possible future patients or patrons of those graduates who had been fitted to serve them. It is argued, a doubtful power in a charter does not exist; this is a sound rule of construction of corporate grants, but it is just as well settled that if the power is necessarily implied from the object and terms of the grant, it is to be recognized as if expressed."

INDEX TO ADVERTISEMENTS.

	PAGE
American Endoscopic Co.	49
American Hard Rubber Co.	48
Antidolar Mfg. Co.—Anesthetic	45
Archer, Chas. S.—Dental Depot	34
Baltimore College of Dental Surgery	59
Birmingham Dental College	58
Blair Fountain Spittoon Co.	41
Burnham Electric Co.—Battery	36
Carroll, Dr. H. M.—Retainers	46
Chase Com. Plate Co.—Supplies	28
Canton Surgical and Dental Chair Co.	45
Central Dental and Chemical Co.	29
Chicago Kindergarten College	55
Chicago College of Dental Surgery	60-1
Chicago Dental Specialty Co.—Gas Outfit	51
Dartt Publishing Co.—Ledgers	47
Dee, Thos. J. & Co.—Refiners	38
Dentacura Co.—Tooth Paste	2
Douhet Dental Mfg. Co.—Vulcanizer	25
Dunn, Dr. E. H.—Fulcrum	45
Detroit Dental Mfg. Co.—Specialties	43
Dental Protective Supply Co.—	
Adjustable Slip-Joint	10
Rubber-Dam	40
Discounts	5
Angle Attachments	7
Clark Fountain Spittoon	42
Dental Engine	15
Vulcanite Rubbers	6
Fellowship Alloy..12, 13 and colored insert	
Dual-Blade Burs	4
Teeth.....19-23 and back cover	
Fellowship Broaches	33
Lithos Cement	14
Philadelphia Branch	18
Inlay Enamel	16
Repair Work	17
"No. 1" Handpiece	8-9
Fairchild Chemical Laboratory—Sanitol	39
Frink & Young—Crowns	53
Amalgam and Cutting-Fluid	35
German-American Dental College	58
Gesswein, F. W. Co.—Ruby Crystal	24
Gilbert, S. E.—Specialties	36
Goodrich, B. F. Co.—Rubber	28
Goldsmith Bros.—Refiners	37
Howard, C. T.—Strips	29
Harvard University—Dental Dept	54
Hammond, John F.—Cement	32
Hall & Ruckel—Sozodont	3
Hall, Wm. R. & Son—Disks	46
Harvey, G. F. Co.—Ethyl-Chlorid	31
Hampton & Co.—Dental Journal	32
Hisey Mfg. Co.—Anesthetic	34
Indiana Dental College	56
Lambert Pharmacal Co.—Listerine	1
Lowry, Dr. H. S.—Crowning Outfit	44
Magrath, Jas. T. & Co.—Supplies	27
Manhattan Dental Co.—Platinoid	30
Mexican Plantation Association	4a
Mason, W. L.—Matinum	11
Morgan-Maxfield—Disk Mandrel	30
McKesson & Robbins—Vapocain, Cover page 3	
Morgan, Hastings & Co.—Gold Foil, etc.	50
Meyer, Dr. J. H.—Post-Graduate School	56
Moore, E. C. & Son—Apron	31
Munn & Co.—Patents	26
National Medical Exchange	27
Northwestern University Dental School	62
New York College of Dentistry	57
Ohio College of Dental Surgery	56
Palisade Mfg. Co.—Borolyptol	64
Penna. College of Dental Surgery	63
Phillips, Chas. H. Co.—Milk of Magnesia, Cover page 2	
Pope Mfg. Co.—Columbia Bicycles	54
Rugg, Frank E.—Nickel Plater	30
Russell Electric Mallet Co.	29
Saul, J. A.—Patents	29
Schering & Glatz—Eucain	39
Spooner, Dr. F. B.—Cotton Trap	27
Snyder, Dr. F. L.—Disk	32
Vanderbilt University—Dental Dept.	54
Willson, H. B.—Patents	26
Webster Mfg. Co.—Blow Pipe	40
Weld, G.W.—Chemico-Metallic Method	28
Weller Dental Supply Co.	52
Wilcox, A. A., Laboratory—Cement	26
Wenker, Dr. R. J.—Ledger	24

The particles of food

which find lodgement in the interstices of the teeth and in the tooth structure, form a most suitable pabulum and very secure habitation for bacteria; consequently, the Dental Profession has subjected to very careful test the various antiseptic and disinfectant agents known to science, with the object of ascertaining their exact inhibitory or germicidal value, and their general adaptability to the practice of dentistry. In the researches by Professor Miller, of the Royal University of Berlin, to determine the most available antiseptic for the prophylactic treatment of the oral cavity, and for the preservation of the teeth, the action of Listerine was particularly noteworthy for the rapidity with which it acted upon the fungi of the mouth, and it was clearly demonstrated to be one of the most powerful, and the safest of the available antiseptic solutions.

Listerine has proven a very useful agent in Dental Practice:

To treat antiseptically all diseases of the oral cavity.
To prescribe as a detergent prophylactic mouth wash.
To cleanse and deodorize before operating.
To wash and purify the mouth after extracting.

Dealers in drugs, everywhere, will promptly fill your prescriptions for Listerine, but in consequence of the prevailing evil—substitution—we request that an original package be ordered, thus assuring to the patient genuine Listerine.

Upon demand, we shall send you "Listerine in Dental Practice," a compilation of interesting reports descriptive of the antiseptic utility and general adaptability of Listerine to the dental art.

Lambert Pharmacal Co., Sole makers of Listerine, St. Louis.

DR. J. LEON WILLIAMS,

who stands pre-eminent among dental authorities, declares that almost all softening of the enamel and structural decay of the teeth are due to the action of acids excreted by bacteria in the mouth. He says: "My own opinion, based on an experience extending over five years, is that we can place in the hands of our patients the means of preventing at least two-thirds of the dental decay now prevalent."

Dr. A. C. Hart likewise declares that by preventing the growth of bacteria in the mouth, he can preserve the teeth of his patients indefinitely.

The late investigations of the special committee appointed by the New Jersey State Dental Society to search into the subject, demonstrated that the safest, most effective and available antiseptic and disinfectant adapted to dental and oral prophylaxis, was a new and powerful germicide, which scientifically combines the cleansing, healing and preserving properties of Eucalyptol, Tymol, Formaldehyde, Boric Acid, Menthol, Cinnimic Aldehyde, Benzoin, Myrrh and Wintergreen.

"Dentacura," the name given to this new agent, derives its remarkable germicidal power from its chemical property of **UNITING with the bacteria** and combining with the nitrogenous and albuminoid matter found in the mouth, and **TRANSFORMING both the bacteria and the products of decay into new and true chemical compounds, which are not only sterile and odorless, but often are actually antiseptic themselves.** It thus annihilates the very principles of fermentation and decay and must from necessity conserve to the preservation of the teeth.

Before the investigating committee of the New Jersey State Dental Society placed Dentacura at the head of all Dental and Oral Prophylactics, Dr. S. C. G. Watkins, the Chairman of the Committee, states in a letter published in the January *Items of Interest* that "After a most conscientious and unbiased examination of the leading antiseptics and dentifrices, and an especially close observation of the action of all such, **in cases of inflamed and spongy gums, pyorrhoea alveolaris, and excessive accumulations of salivary calculus,"** he prepared the report which "conclusively demonstrated" that **Dentacura "possesses all the requirements of an ideal prophylactic."** Dr. Watkins further affirms that "the statements presented by the Special Committee on Prophylaxis to the New Jersey State Dental Society are indisputable facts, and any honest and thorough investigation will justify all the findings presented in that report."

In Dentacura, Dr. Williams' statement is more than verified. "Every dental practitioner can place in the hands of their patients the means of preventing at least two-thirds of the dental decay now prevalent," and can maintain the mouth in such a perfect state of antisepsis as to prevent most if not all of the dental and oral diseases characteristic of bacteria infection.

Dentacura Co., Newark, N. J., invite correspondence from the profession and shall be pleased to send literature and samples of Dentacura.